Landscape Architecture and Big Data: *It's crunch time*

A dissertation submitted in partial fulfillment of the requirements for the Degree of Master of Landscape Architecture at Lincoln University 2016

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Big data is growing in volume, variety and velocity. It is becoming more available as open data due to rise in prominence and significance, along with an increase in government policies and inter-governmental agreements such as The Open Data Charter. Big data, if used as part of the design process by landscape architects, has the potential to broaden and inform site understanding. However, working with big data and analysing the diverse range of datasets is currently the main challenge. It is unclear whether the appropriate tools are available in landscape architecture to analyse and work with big data at present.

Through a literature review, a critique and a matrix evaluation, a clearer understanding of the current tools used in data analysis approaches are presented. Three data analysis approaches are applied to a case study site (Waitangi Park, Wellington, New Zealand).

The case study reveals that landscape architecture does not currently have the tools to work with big data and that there is a clear gap between analysing geospatial data and non-spatial data. The implications are that if landscape architecture is to take full advantage of working with big data, better tools and data analysis approaches need to be developed.

Abstract

Big data, Overlay Method, Geodesign, Data Visualisation, Information Design, Infographics, data analysis, site data.

Keywords

Thanks goes to the Invercargillite, David Strang, who gave the world instant coffee. The following pages could not have been produced without it…

This dissertation would not be complete without acknowledging two sets of amazing people.

The first is the staff at SoLA, particularly my supervisor Jacky Bowring, whose calmness, inspiration, clarity and lateral discussions helped to steady me through all the ups and downs to reach the end. I would also like to express my appreciation to the staff who provided the foundation for this dissertation through the courses that were undertaken: Simon Swaffield, Jacky Bowring (again), Shannon Davis, Mick Abbott and Andreas Wesener. The course content and your leading were invaluable.

The second, and equally important group of people to acknowledge, is my family. Thank you Jill for three years of tolerance, late nights, and endless cups of hot drinks. Thank you to my precious girls, Quinn and Ava, for keeping me on my toes and for (finally) sleeping through the nights.

Acknowledgments

Table of Contents

List of Figures

"... data is so readily available and inexpensive that the pearl often becomes buried in the sand: meaningless information is nothing but noise."

Yu (2015)

"Discoveries are not just made in the black void of the unknown, but in the white noise of overwhelming data"

Ruzo (2014)

1.0 Introduction

This dissertation began with a book.

While flicking through a range of design-related books at a local bookshop, one left me amazed and left a lasting impact. The book, London: The Information Capital (Cheshire & Uberti, 2014), contained an array of large datasets and information that were displayed in ways I had never contemplated before. As I stopped skimming and read the introduction more thoroughly, it discussed how each day we are all increasingly producing an immense amount of data, or big data, and that New Zealand is ranked fourth in the world by the amount of data it makes publically available through governmental agencies (see Figure 1). This was something that captivated me, especially when we were significantly ahead compared to other developed countries such as Australia or Norway.

I work with data in a number of ways in my teaching role and see that many of the projects that students within the Landscape Architecture programme here work on, require collecting and analysing site data. Cheshire and Uberti's book made me stop and question how much big data I was using and if it were beneficial to myself or students when dealing with a real site. So the questions I began to ask were whether landscape architects take advantage of big data and what tools are available to analyse them.

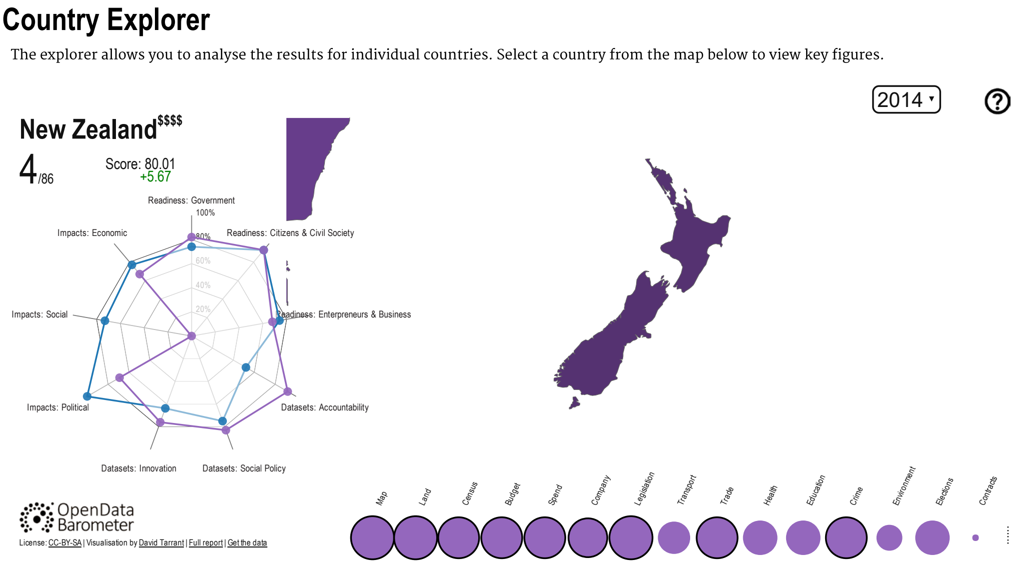

FIGURE 1: Open Data Barometer: 2014 Global Report showing New Zealand's ranking of 4th in the world for its open data rating. Image: Web Foundation (2015)

1.1 What is "big data"

The term 'big data' has been used since the early 2000s as the personal computer has gained in popularity, but the term was first used academically by Diebold (2000) to assist with statistical forecasting. Diebold later points out that he was not exclusive in using the term and that it was first used by industry in the mid-1990s by Silicon Graphics and showed a "clear awareness of Big Data the phenomenon" (Diebold, 2012:3).

Finding a definition of big data would seem a simple task but one soon discovers that a definitive scope of big data is wide-ranging. Mayer-Schönberger and Cukier state that "there is no rigorous definition of big data" (2013:6) and that it is not necessarily big "in absolute terms" (2013:28) as our perception of what is 'big' will no doubt change with time and technological advancement. The notion of 'big' can also refer to not just one large dataset but also many datasets accumulating into a larger set. After carrying out a survey of the different definitions that have been previously presented, De Mauro, Greco and Grimaldi (2015) proposed that the definition include three V's to describe it: Volume, Velocity and Variety as shown in Figure 2.

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FIGURE 2: The three V's of big data. Image: James (2013)

It is important to introduce the similar, but not identical, concept of "Open Data" which can be defined as:
"Open data and content can be freely used, modified, and shared by anyone for any purpose" (The Open Definition, n.d.).

1.2 Big data's increase and availability

Through web-based portals and live streams, fed by a growing, connected and mobile culture, data is growing at an exponential rate. Estimations of the volume of stored data in the digital world will increase from 300 exabytes (1000^6) in 2007 (Mayer-Schönberger & Cukier, 2013) to over 40 zettabytes (1000^7) in 2020 (Havens, 2014). This data is not only growing in volume, but is also becoming increasingly diverse (Soubra, 2012) as shown in Figure 3, and more available to not just businesses but to the wider public through the rise of open data policies in place by governments (Gurin, 2014).

The main difference between open data and big data is that open data is fundamentally accessible to the public, whereas big data is not necessarily public nor easily accessible (see Figure 4). Both can be large volumes of data,

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FIGURE 3: Big data is increasing in all directions. Image: Soubra (2012).

therefore open data can be big data; big data can also be accessible and therefore could be referred to as open data. For the purposes of simplicity in this dissertation, I will use the term big data to describe a large number of datasets which contain user or geographic information that is accessible.

In New Zealand, the government has placed particular emphasis on making large datasets available to the public. In 2008 the government launched the 'Open Government Information and Data Work Programme' (also referred to as the Open Data programme) and continued this priority with the 'Declaration on Open and Transparent Government' in 2011. Internationally, the United Nations has created the Global Pulse initiative which aims to harness big data for development and humanitarian action, and a Data Revolution Group. There are independent initiatives such as the International Open Data Charter 2015 which mandates that signatories follow its principles and best practices for releasing open governmental data to ensure it is accessible, usable and comprehensive.

Another aspect of big data's increase is revealed in the breadth of its application throughout many areas of society, science and research. TED, a prominent and global innovation-driven community of scientists, thinkers and designers, has 137 results for talks and presenters which discuss big data. These

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FIGURE 4: Venn diagram showing relationships between big data, open data and open government according to Gurin. Image: Gurin (2014).

range from using big data to inform healthcare providers and law enforcement, to addressing global issues such as climate change, or finding the best place to park in a city.

1.3 The significance of big data

The increasing volume and availability of big data has led to an increase in its significance. As mentioned, big data has spread into many fields and this has had a major influence. Although critics have touted it as just hype, there are several characteristics of big data that have made an impact and show how it has become significant.

A key attribute of big data that has helped increase its significance is its ability to capture all (or at least a large percentage) of a dataset. Previously this was not possible due to factors such as cost. Datasets relied on samples from which to derive correlations (Mayer-Schönberger & Cukier, 2013). This reduced reliance on forms of information gathering, such as sampling, has provided for a better representation within the datasets, and all of this has been made possible as our ability to process large quantities of data has increased. These datasets are more inclusive of an entire layer, a population, a scenario, a narrative.

Using big data to build our understanding and to make predictions is another attribute which has added to its significance. Mayer-Schönberger and Cukier note that it helps us to see relationships between disparate pieces of information and "points us toward understanding" (2013:197). This understanding of relationships and correlations can be used to inform decisions based on verifiable data, and this data is becoming more central to decision-making and sustainable development (Barroso & Le Goulven, 2014).

1.4 Big data in design

Landscape architecture is a complex, interdisciplinary profession which takes into account many different streams of information and uses a broad scientific knowledge whilst applying an artistic creativity at the same time (Gazvoda, 2002). Landscape architects already use a wide range of tools for design (Gonot, 2013) and it is appropriate that we should make use of available big data. Big data is beginning to be explored within landscape architecture with individual social media datasets, such as Flickr with their geotagged photos, revealing how people interact with the environment (Lee, 2013).

Though the topic of data analysis is not new to landscape architecture (Steinitz, 1990), the continuing increase in data volume, variety and availability and how it can be incorporated into landscape architecture, is not widely discussed. Prominent landscape architecture theories, such as Landscape Urbanism, have underlying principles that benefit from (nay demand) the use of big data (Weller, 2007).

Landscape architecture is often exploring ways of interpreting and representing attributes of the landscape which are unseen. Amoroso discusses how landscape can be represented using data originated from the site, and how "they can visualize the intangible and often invisible forces that shape our environment" (2015:4).

With the increase of data-reliant systems such as parametric modelling and Building Information Modelling (BIM) within the design of buildings and large infrastructure projects, big data is the single most important ingredient for creating 'Smart Cities' (Townsend, 2013). Woods Bagot, a global design and consulting firm, has developed a design process named 'Super Space' which works with unlocking big data to create human-centred experiences.

Within the urban design realm, big data has so far been mostly used by city government for operational purposes: to save money and improve services. However, it has been used rather less for planning and design to date. Research into big data has concentrated on other industries such as health, retail and transport. What we see from those industries is that big data has great potential to improve design through analytics (Royal Institute of British Architects & Botazzi, 2014).

Design professionals in related fields are using big data to innovate and provide successful outcomes, and there is the opportunity for big data to inform landscape architects in making design decisions.

With the increase in public scrutiny in civic spending through the media and community groups, as well as the constant need to design fiscally responsible and sustainable projects, evidence can be provided through the inclusion of big data in our design processes. To include big data effectively, the appropriate data analysis tools need to be available.

1.5 Research Questions

This research will focus on placing big data analysis into the existing body of landscape theory, identifying the potential for working with big data in landscape architecture, as well as identifying significant gaps in its application.

Figure 5 (overleaf) shows my diagramming of areas of interest, and in particular, my research questions are:

1. What data analysis approaches do landscape architects currently use?

2. Does landscape architecture have the necessary tools to inform design outcomes using big data?

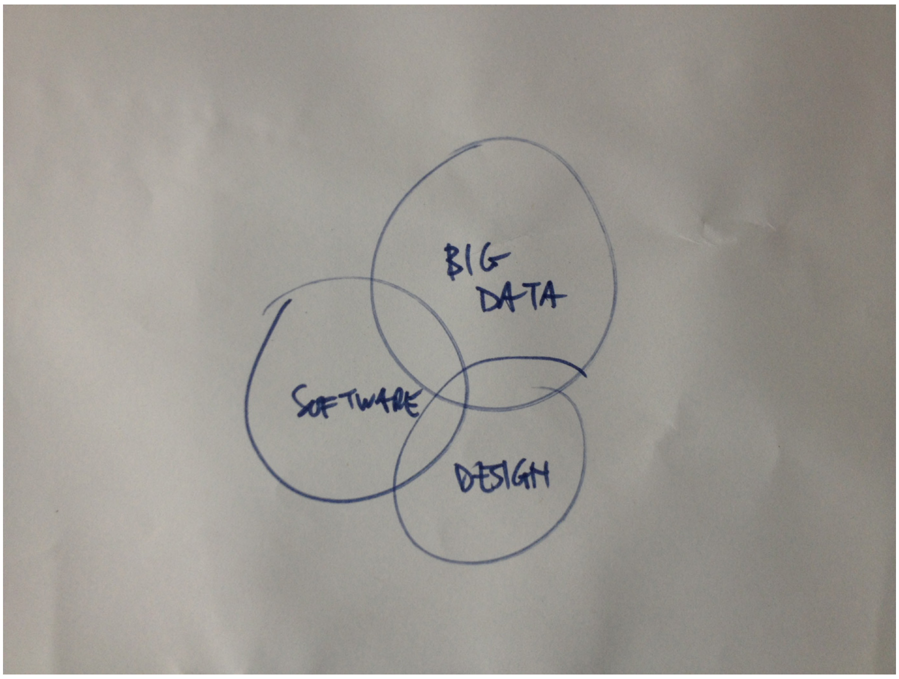

FIGURE 5: Initial mapping for the research questions

3. What obstacles are there when working with big data?

4. What gaps need to be addressed to ensure landscape architects can use big data to inform their decision-making in site design?

My overwhelming concern was how landscape architecture is, or can be, connected to big data. Figure 6 expresses their relationship as one which relies on both machine processing and cognitive processing.

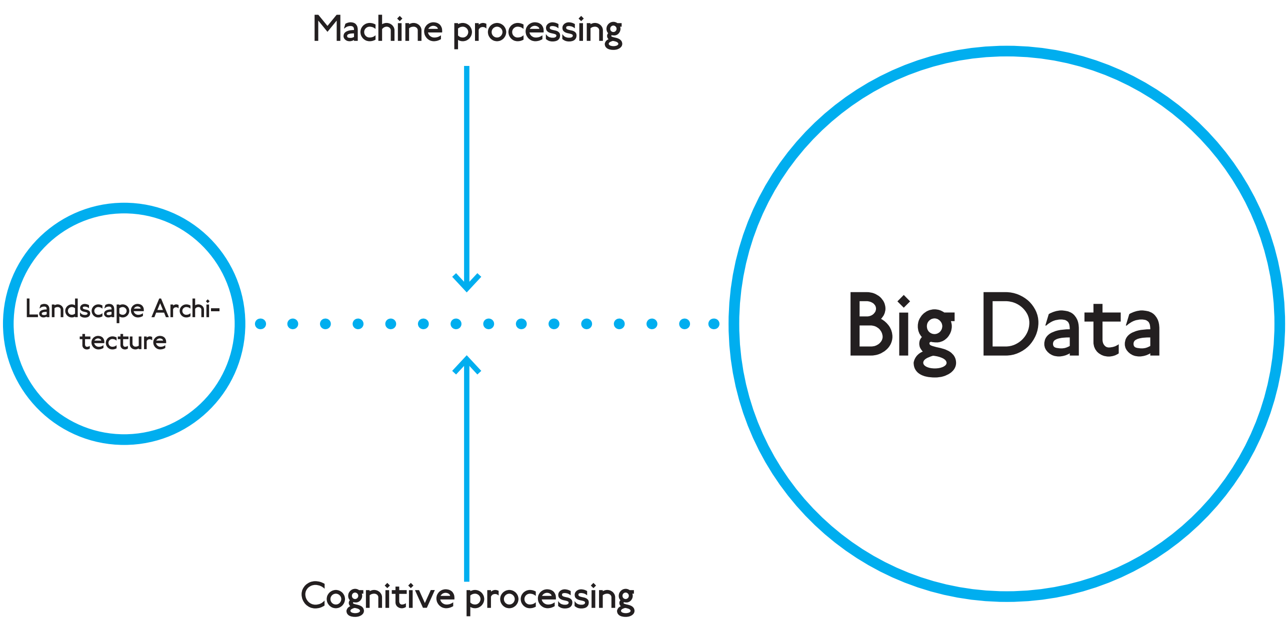

FIGURE 6: Identifying connections to connect landscape architecture with big data

2.0 Methods

2.1 Scoping

My research has been exploratory in character, with the initial question of “do landscape architects use big data” forming the direction in which it has been guided. Defining what big data actually was shaped the early phases as there was no indicators as to what I was looking for and where I would find it.

2.2 Literature Review

Using a preliminary set of keywords, my research located a broad setting of readings and these framed the background to comprehending the sphere of knowledge in this field and how diverse the terminology was (which required constant rationalisation). Once this was complete, a literature review was undertaken, revealing the current data analysis approaches from within the profession of landscape architecture along with those from other fields. The literature review also sought to identify common themes between them, as well as any potential gaps that could be investigated. This research method was a key part of the process as it not only outlined the current known body of knowledge, it revealed which avenues required further investigation and helped crystallise the research questions as a result.

2.3 Data Collection

A parallel line of inquiry, as shown in Figure 7, was the collection of data. A site was selected on the following criteria: a significant civic space (such as a park), one that has a high-profile within the landscape architecture profession (such as a sustainable design exemplar) and the potential for collecting a large amount of data. Waitangi Park in Wellington, New Zealand, was decided upon. The collection of the data then began in an ad-hoc manner as the data was found spread out across multiple sources such as government agencies and social media, but began to be more directed once I had explored precedents of big data categories and adapted these into a proposed set of categories. This provided me with a clearer approach as the data sources were more accurately targeted and revealed which categories of big data were missing or unobtainable.

2.4 Critique

The second phase involved a qualitative methodology using a descriptive critique and a criteria matrix by which the identified data analysis approaches were evaluated. The critique outlined each approach's process and workings as well as looked at how they addressed big data. The criteria matrix was more evaluative and gave a score for seven different criteria; three of these related to the attributes of big data, and four related to their feasibility for practicing landscape architects. Three data analysis approaches were selected based on highest scores with two from the known body of landscape architectural practice and one from outside of this.

2.5 Case Study

The method for testing these was decided to be done through a case study site – Waitangi Park. The case study method was chosen as it provided a grounded method that enabled the application of the data analysis approaches in a more exploratory way than merely discussing the possibilities. It also demonstrated a process that landscape architects could follow and make use of.

2.6 Data Analysis

The final phase involved the three data analysis approaches being applied to the case study site using the datasets gathered as described in the literature, and then summarised for discussion to identify benefits, weaknesses and gaps that needed to be addressed.

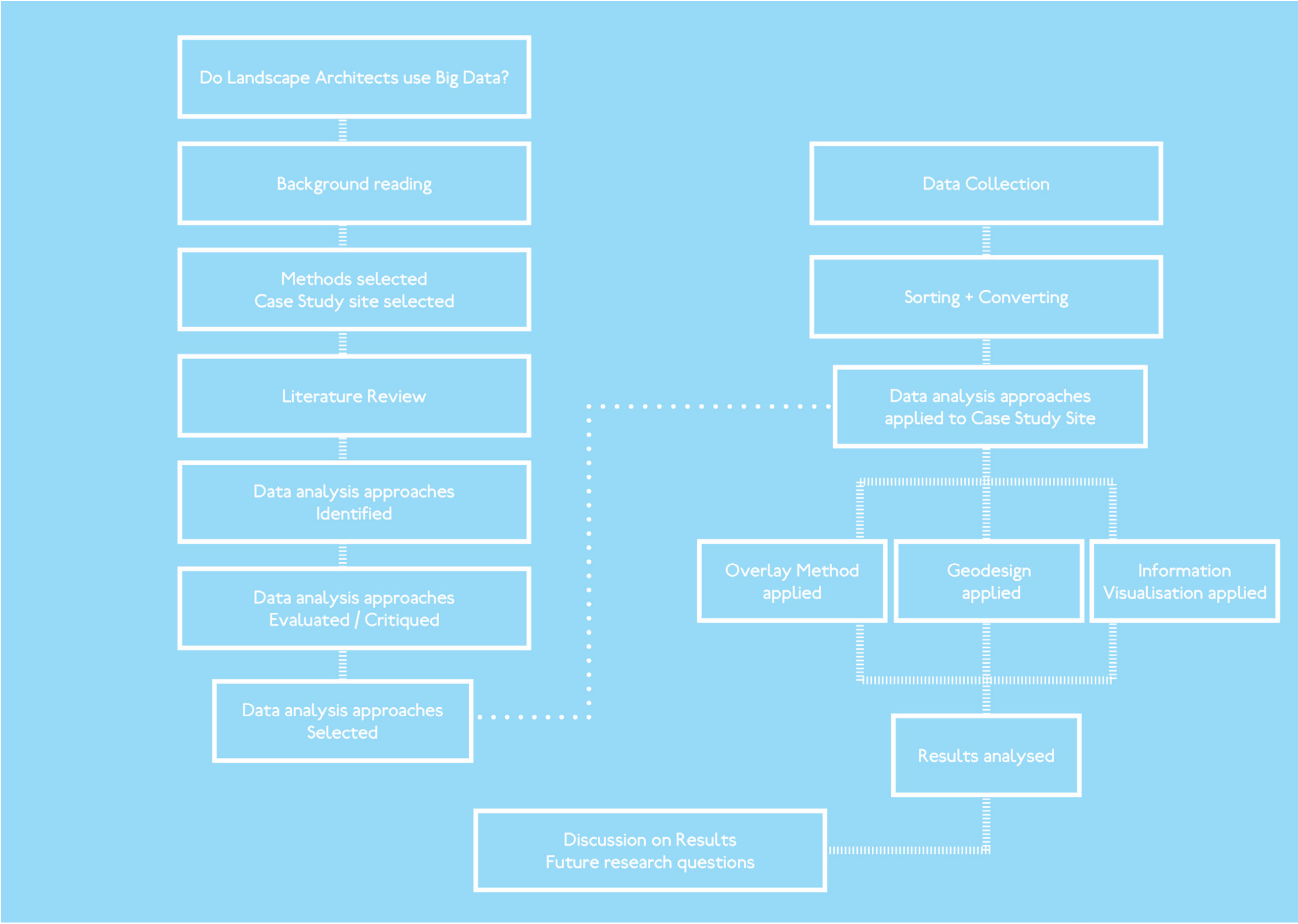

FIGURE 7: Flowchart of the parallel research process followed. The converging of the data stream and literature stream is shown as a dotted line

3.0 Data analysis approaches

3.1 Literature Review

This literature review has been divided into the four broad themes which recur throughout the literature when addressing data analysis: understanding the data; communicating the information effectively; the relevance of context; and the end goal of data analysis - outcomes.

As I began this literature review, it quickly became apparent that there were limited papers and publications that covered both the topics of landscape architecture and big data, and that where there were some published works they were very recent (within the last three years). When I collated the number of publications found in Google Scholar that had the phrases "landscape architecture", "big data" or both, the results were alarming. As can be seen in Figure 8, the number of published works discussing landscape architecture have been declining since 2012, at which point published works on big data begin to soar and climb steeply above landscape architecture. Published works on both phrases were increasing – but were still negligible. When the same process was applied to Google Trends (which is based on how often a particular search-term is entered relative to the total search-volume in Google Search) there was some hope as, even though the phrase "landscape architecture" was still in decline, the inclusion of both phrases paralleled the increased search frequency of big data.

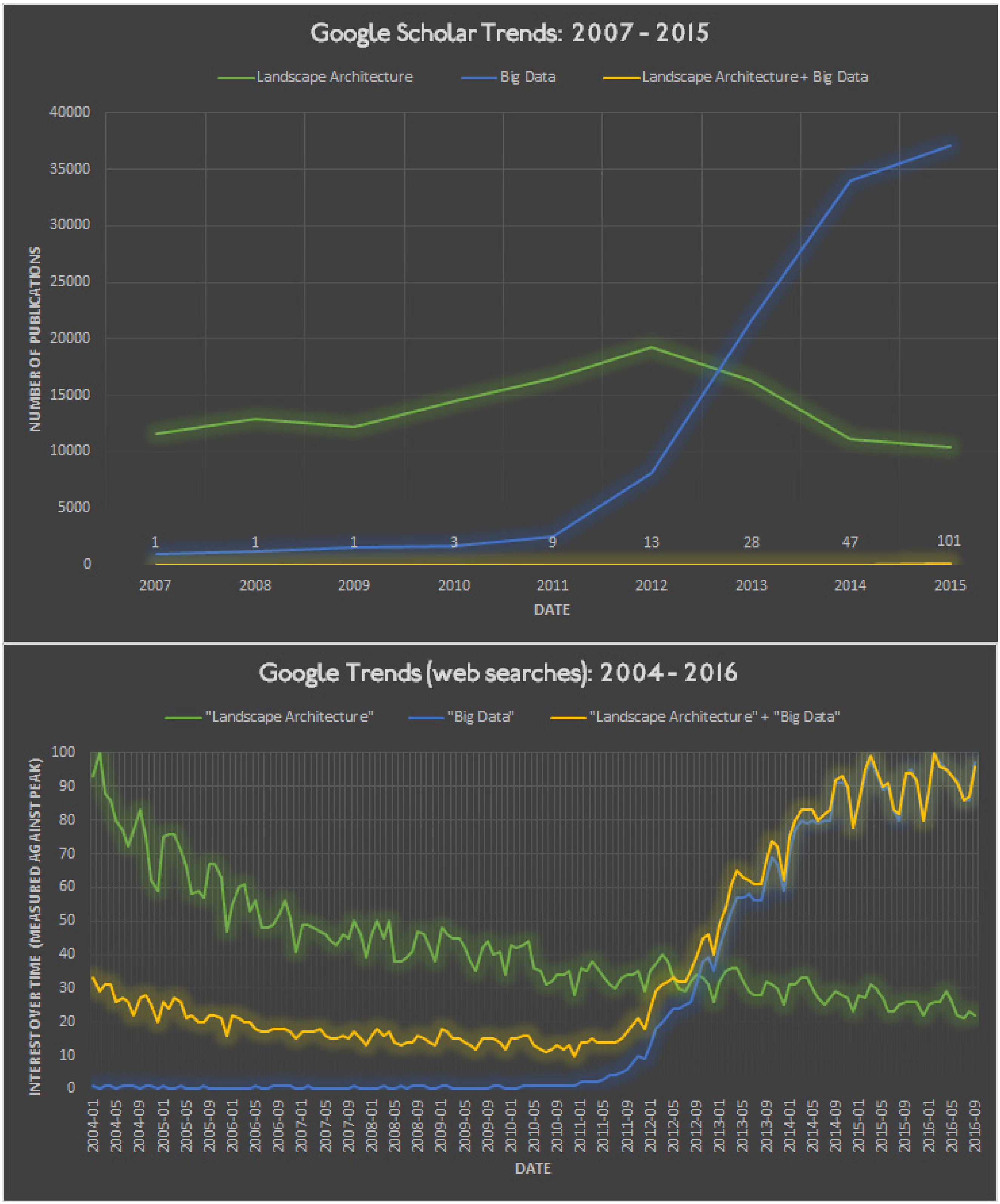

FIGURE 8: Frequency graph of phrases for landscape architecture and big data in Google Scholar and Google Trends. Landscape architecture frequency is shown as a green line, big data as blue, and the inclusion of both in yellow

3.1.1 Interpreting

Interpreting data is at the core of data analysis (Boyd & Crawford, 2012), and within the literature interpretation is achieved through methods such as working with layers of information, by asking questions or by exploration through graphic media.

The use of layers is a recurring theme in landscape architecture approaches and can take the form of analogue tracing sheets or complex digital datasets. The first form was made popular by the book Design with Nature (McHarg, 1969) where he took discrete datasets, placed them into single layers of information, then overlaid them onto a site to 'reveal' a deeper understanding of the information. The major difference between how McHarg used overlays and how others before used them, such as Elliott (Motloch, 2000) was that he included layers which hadn't been incorporated before, such as 'ecological values'.

Another method of using layers to understand data in the literature is through computer programs, specifically Geographic Information Systems (GIS). Whilst the program in itself doesn't automatically understand the data, the way in which the data is combined and processed is where understanding is achieved. Design processes such as Geodesign have attempted to incorporate layers of knowledge within a framework from a variety of sources but even McHarg acknowledges that this method has not advanced much further than his approach 30 years earlier (Dangermond, 2010). Using layers of information is suitable when they are formatted correctly and rely on geocoded data but complex layers, such as integrating social and ecological values, have rarely been attempted using GIS (Ryan, 2011).

One concept identified in the literature discusses how data can be understood by asking the right questions. Etlinger (2011) identifies that current analytics require writing a 'query' or a question to understand the data, and Steinitz (1990) extends this concept of querying by using a set of six questions as part of the analysis:

1. How should the landscape be described?
2. How does the landscape operate?
3. Is the current landscape working well?
4. How might the landscape be altered?
5. What predictable differences might the changes cause? And
6. How should the landscape be changed?

Graphic media, especially the production of hybrid diagrams such as 'datascapes', can also demonstrate ways for interpreting complex relationships (Hansen, 2015). Visual representations can include both maps and diagrams as they merge more than one display method and can take into account the "plethora of data" (Hansen, 2015:29) available to us to inform site design. After all, understanding is the main goal since data only identifies the problem (Shen & Long, 2015).

3.1.2 Communicating

Communicating the data through visual representation is a common component of the data analysis approaches identified within the literature. Major themes become apparent such as the efficiency of visual perception through cognitive processes to absorb large amounts of data, that design is required for the greatest benefit, and that designers use this form of communication for not just themselves but for informing the networks that they are involved with.

Our cognitive systems can process information to identify properties, regularities, patterns or relationships, and using visual representations in the analysis of data is one of the approaches that benefits from this human skill (Mazza, 2009). These data visualisations can be very effective if designed well, turning unappealing and bland

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FIGURE 9: Beck's 1931 London Underground map. Image: Beck (1931)

datasets into engaging and powerful agents of change – or as Lankow, Ritchie & Crooks put it, "Design is to data what cheese sauce is to broccoli" (2012:40). The con of these visual representations is that if the selected method of displaying the data is not well chosen, it can be misleading or worse – wrong (Tufte, 1997).

Cognitive systems can also process information subconsciously as Novich and Eagleman (2015) showed through the use of encoded vibro-tactile information being processed by the brain through contact with skin. Communicating information in ways that are not reliant on visualisations are being explored and is an area of development.

An example of a simple yet complex demonstration of an information visualisation is Henry Beck's 1931 map of the London Underground. Shown in Figure 9, Beck chose to alter the accuracy of London's geography in order to create a better system of display, and his 'map' has been held up as an exemplary visualisation (Cheshire & Uberti, 2014).

The interface for communication is also changing with advances in technology and online platforms using Flash, HTML5 and other coding languages. Periscopic, who is a socially-conscious data visualisation firm, uses these to inform their data analysis approach - Data Storytelling - to create interactive visuals to enable users to see the data in multiple ways including splitting the data or watching patterns unfold over a time period.

The final theme relating to the communication of information is that as designers, we work within a democracy and as such, we inform the public through these data analysis approaches and are required to communicate with clarity and transparency (Steinitz, 2010). Landscape Architecture is a "social phenomenon" (Swaffield, 2002:183) that is working in relationships between individuals, groups and wider socioeconomic processes and therefore should aim to provide this data in ways that are efficient, engaging, stimulating and informing.

3.1.3 Context

While predictions can be easily made, the power of big data is in its context (Lohr, 2015) and using the appropriate analysis approach is vital to ensuring the veracity of the decisions that come out of the data. Context provides meaning to the data for the user as it enables it to be seen within the networks of what we already know and understand (McCandless, 2014). "[T]aken out of context, data lose[s] meaning and value" (Boyd & Crawford, 2012:670) and if we are to work with these diverse datasets we need to consider the context in which it was collected.

3.1.4 Outcomes

The end goal of the data analysis approaches is to reach some form of an outcome, including making predictions about the future to inform decision-making. Mazza emphasises that this is an important trajectory and that we need "effective methods that allow us to go through this information" (2009:1). While Mazza and others see predictions as achievable, some such as Hill (2005), state that trends cannot be predicted when we integrate nature and culture and that surprises should be expected. Whether prediction is achievable or is a flawed concept, one thing appears clear – that the technologies we currently use to evaluate current and potential future conditions, are changing at accelerating paces (Steinitz, 2010).

Exploring possible design solutions and evaluating these alternative futures is another outcome from analysing big data. Geodesign is an approach which follows this idea by creating simulations which are "informed by geographic contexts" (Flaxman, 2010).

3.2 Data analysis approaches: critique + matrix evaluation

From the literature review, a number of data analysis approaches were identified in the literature and there was a clear distinction between those which were found to be part of the theory of landscape architecture, and those outside of it. In Figure 10 I locate these approaches on a matrix, highlighting an emphasis on those which have the ability to process more data, and those that rely on more cognitive ways of processing.

The prominent data analysis approaches shown to be used in landscape architecture theory for dealing with site data are the SAD (Survey-Analysis-Design) method, the Overlay Method (often referred to as Ecological Design) and Geodesign (Turner, 2014). Of note is the prevalence of the use of 'layers' in each of the three approaches.

Data analysis approaches outside of this body of knowledge identified for critique and evaluation are Data Visualisation (Tufte and McCandless), Data Storytelling (Periscopic), Data Augmented Design (Shen and Long), and Data Sensory Perception (Novich and Eagleman). These could prove useful in pushing or dissolving the boundaries between analysis methods in different fields and could assist designers to work with big data in new and meaningful ways.

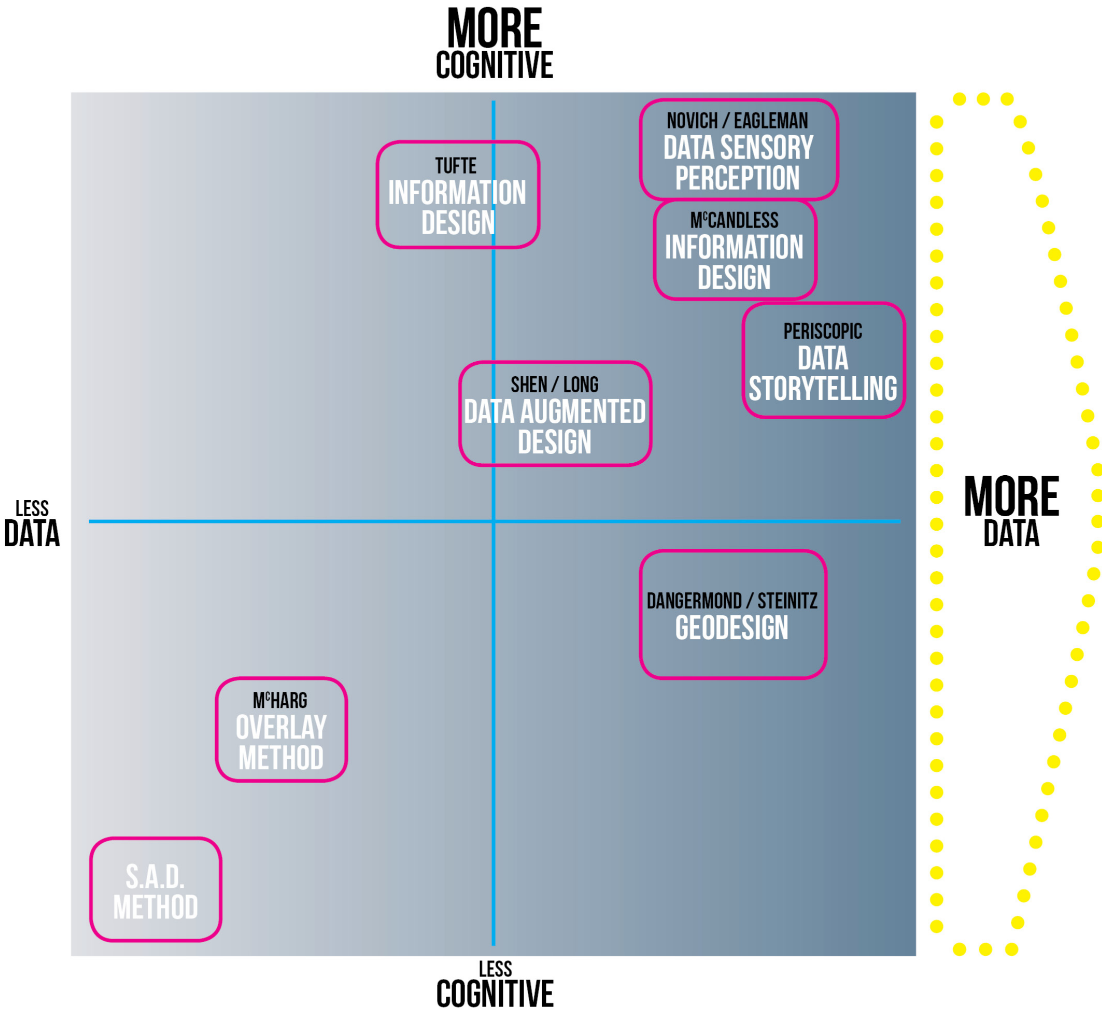


FIGURE 10: Locating data analysis approaches (as identified in the literature review) within a quadrant matrix

3.2.1 Critique of current data analysis approaches

The next phase in this literature review is to carry out a descriptive critique of all the aforementioned approaches, then evaluate them based on a criteria matrix using seven criteria to evaluate each approach. The first three address the three V's of big data (Volume, Variety, and Velocity), with the remaining four criteria evaluating their application for practicing landscape architects (cost implication, ease of use, geospatial context, and ability to work at a range of scales).

SAD method

The SAD method is a three step process of design which is based on the premise that "design 'problems' should be 'solved'" (Turner, 2014) and often involves three sheets of paper. The steps are Survey, Analysis, and Design with minimal 'layers' of information and therefore limited scope for large datasets. It is a quick and minimal approach to data analysis in a site context.

Overlay Method

The Overlay Method was first used by Charles Elliott (Motloch, 2000) with McHarg taking it further using suitability analysis as its dominant outcome and this further application of the technique has possibly encouraged its use within landscape architecture (along with the popularity of the term 'ecological design').

The degree of its integration with big data is limited due to the limited number of layers of discrete data that can be included at any one point and instead summaries or further steps in the process are required to make sense of the results. It does however have the ability to work with a variety of scales but certainly is more applicable at a larger scale such as at a regional level (Turner, 2014). The technique itself contains no mechanism to process data but does allow the ability to give the information a hierarchy - which could later be used in analysis. This lack of a mechanism also means that there is a simple linear process that is followed and McHarg himself acknowledged this with his statement: "… where any man, assembling the same evidence, would come to the same conclusion" (Turner, 1996:146). Finally, there is no capacity to work with non-spatial inputs as the layers require surveyed, geolocated data.

Geodesign

This approach has its roots in the Overlay Method (Turner, 2014) and has been influenced by Steinitz's model of landscape change which addresses landscape futures by asking geographic questions. There is still a strong focus on suitability maps (as found in the Overlay Method) and these are produced alongside charts, graphs and statistics (Dangermond, 2010).

Miller notes the advantages of the geodesign approach as being able to handle complex sets of geospatial data but that the digital tools used "… are non-intuitive and relatively difficult to use" (2012:22). The geospatial analysis tools, such as Geoprocessing Tools, require a predetermined set of land uses or land-use management strategies in order to assess or create an output (Miller, 2012). These outputs are either geographic displays such as maps, or scalar values (working with a shape).

DAD (Data Augmented Design)

The Data Augmented Design approach was developed by Shen and Long and seeks to "quantitatively understand" urban orders within this new data environment using big data (Shen & Long, 2015:12). It involves the specific selection of datasets to include surveyed data, sensed data, and urban ordering data, with the use of an advanced spatial information system to analyse and model the raw data. Outputs can be displayed as a series of visualised results – whether these would be shown as geospatial maps or graphics are not clear.

The major advantage of this approach, as stated by Shen and Long (2015), is that it is a framework that is scientific and removes any knowledge or innovation inadequacies a designer may have.

Data Visualisation

This is the broadest of all the approaches critiqued and there are numerous individuals who have furthered this such as Tukey (1962), Tufte et al (1980), McCandless (2009) and Yau (2011). Due to this spread of thinking within the overall approach, I have identified two splits: Tufte with an approach that is reliant on simplifying data, and McCandless who seeks to use technology as well as cognitive processing to analyse data. These two divergent approaches have appeared due to the dominance of academics and scientists in the area of information design now being shared with Internet users who also appreciate their effectiveness (Lankow, Ritchie & Crooks, 2012).

Both approaches are governed by rules or guiding principles of 'good design' with the Tufte approach more so, and both are explorative rather than narrative (although the McCandless approach has an element of narrative mixing).

The level of content that can be processed relies on the tools used for each and as previously mentioned, the McCandless approach uses technology such as Google Sheets and online platforms such as HTML5 to display the outputs and can therefore process a larger number of large datasets. There is still a significant reliance on the 'designer' to look at the data and question it, investigating which visual methods would aid its processing, giving a more qualitative than quantitative output.

Data Storytelling

Data Storytelling is an approach that has been used as a method to use technology (predominately coding) to tell a story using datasets. Periscopic is an example of how this has been applied and the impacts it could have are identified through their statement: "…our goal [is] to use technology to visualize solutions that engage the public and deliver messages of action." (Citraro, 2010).

This approach is time consuming, bespoke to each and every story that the data is used for, and requires specific coding skills (HTML5, JavaScript, Flash etc.). Periscopic considers that the creators of this approach are "data visualizers, scientists, flâneur, and sloggers" and come across insights and relationships that were previously unseen (Citraro, 2014).

Many of the visualisations used as a narrative device are interactive; stories that can be split, interrogated and layered. The interactive visuals are also more about ensuring the user is engaged with the data rather than "dumbing down the data" Periscopic (2013).

Data Sensory Perception

The precept for this approach is that we have developed our senses as our brains have become familiar and learned to recognise the information it receives. Novich and Eagleman (2015) encoded vibrotactile information (using motors embedded in in a vest) and through a series of experiments showed that the skin can convert the encoded information in a way that the brain can recognise and process. Although highly experimental, this approach is adaptable to suit specific datasets and this was demonstrated during Eagleman's TED2015 talk in Vancouver in March 2015 where he wore the vest and was 'sensing' twitter handles that related to the conference live during his talk. This approach is the most technologically advanced of the approaches critiqued and shows the highest level of connection between user and the data.

3.2.2 Matrix evaluation

For the matrix evaluation, shown in Figure 11, each approach was given a score under each of the seven criteria according to the following grading:

xx	= -2	: Did not address criterion at all
x	= -1	: Did not address criterion well
√	= +1	: Addressed criterion somewhat
√√	= +2	: Addressed criterion well

The seven criteria used relate to their incorporation of big data and applicability within a professional design office. The big data criteria relate to the three V's (refer to Figure

2), while the professional application criteria addresses the cost to carry out the approach, the usability of the approach and level of skill required, whether the approach is applicable to a geographic context, and if the approach can work across a wide range of site scales.

These scores were then tabulated into subtotals. Using the 'cost' criterion as an example of how this was applied, if an approach required minimal time or capital investment then it was scored a +2, if some time or minimal capital investment was required to carry it out then it scored a +1. If it required a specialist piece of software or an investment in software training then it was scored a -1, and if there were significant cost barriers such as outsourcing or niche skill acquisition then it was scored a -2. We can see that with the SAD method, since it requires usually three or five sheets of paper and some site observation time, it scored a +2. Conversely, Data Storytelling usually required outsourcing the work or a high expertise in working with HTML5 or coding hence a score -2.

The matrix evaluation indicates that analogue approaches such as the SAD method and the Overlay Method are very cost-effective and highly useable, however highly-processed digital approaches, such as Data Storytelling and Data Sensory Perception, have more capacity to deal with big data.

	Big Data Criteria				Professional application criteria				
	Volume	Variety	Velocity		Cost	Use	Geo-	Scale	
SAD method	xx	x	xx	-5	√√	√√	√	x	+4
Overlay Method	x	x	x	-3	√√	√	√	√	+5
Geodesign	√√	x	√	+2	x	x	√√	√√	+2
DAD	√	x	x	-1	√	xx	√√	√√	+3
Data Visualisation (Tufte)	√	√	x	+1	√	√√	x	√	+3
Data Visualisation (McCandless)	√√	√√	x	+3	√	√	x	√√	+3
Data Storytelling	√√	√√	√√	+6	xx	xx	√	√	-2
Data Sensory Perception	√√	√	√√	+5	xx	x	x	xx	-6

FIGURE 11: Matrix evaluation

When the approaches are weighted, as in Figure 12, within the criteria of the V's of big data, the prominent approaches used within landscape architecture score much lower than approaches from outside such as Information Design (both variants) and Data Storytelling. However, the three landscape approaches scored well when the last four criteria were applied. This could explain their popularity amongst landscape architects and why other approaches haven't been explored or developed.

3.3 Summary

From this literature review, there are some data analysis approaches that could be used with big data, but not one single approach addresses the increasing volume, variety, or velocity of big data as well as being applicable to landscape architects. Existing approaches used by landscape architects rely on 2D plans or 3D models built up through layers of geographic data and lack the ability to analyse the data in an explorative, interactive and visual way. Human cognitive processing power responds well to this and can perceive complex relationships better if data is presented appropriately (Mazza, 2009).

	+/-		
	3 V's	App.	TOTAL
SAD method	-5	+4	-1
Overlay Method	-3	+5	+2
Geodesign	+2	+2	+4
DAD	-1	+3	+2
Data Visualisation (Tufte)	+1	+3	+4
Data Visualisation (McCandless)	+3	+3	+6
Data Storytelling	+6	-2	+4
Data Sensory Perception	+5	-6	-1

FIGURE 12: Matrix evaluation – summary and totals

The literature review revealed a lack of discussion of how to analyse big data for landscape architects or site designers. It raises the question about the role of 'data analysis' and whether it is widely accepted within the profession as a part of the design process. There is a sense that it is perceived as too rigid, too scientific, or not innovative and creative enough for a design profession. This tension between the designer's knowledge and ability to be innovative, versus the perceived scientific and objective data analysis, was also noted by Shen and Long (2015).

As stated in the Methods chapter, three data analysis approaches will be selected and applied in the case study site, and through the critique and matrix evaluation I have identified two approaches from within the existing landscape architecture theory that scored highly, and one from outside that scored highly. The three that will be applied are the Overlay Method, Geodesign and Information Design.

	+/-		
	3 V's	App.	TOTAL
SAD method	-5	+4	+0
Overlay Method	-3	+5	+3
Geodesign	+3	+2	+5
DAD	+1	+3	+4
Data Visualisation (Tufte)	+2	+5	+7
Data Visualisation (McCandless)	+4	+3	+7
Data Storytelling	+6	-2	+4
Data Sensory Perception	+5	-6	-1

FIGURE 13: Selected data analysis approaches highlighted

4.0 Case Study: Waitangi Park, Wellington, New Zealand

4.1 Data Collection

Waitangi Park, a 6.5 hectare urban park located on the Wellington waterfront, was selected to be a case study site for this dissertation (Figure 15). It was chosen due to its high public profile, being an example of sustainable landscape architecture, well-established (built 10 years ago), a civic project commissioned by local government, and the potential for collecting a large amount of data. It was also selected as it was a site that I do not know well, helping to ensure that I wasn't influenced by my own local knowledge in data collection.

Data was collected over a three month period, from known online sources, searchable online sources and were all freely available for download. The data was downloaded in file formats which were primarily easy to import into ArcGIS, for example Shapefiles or Geodatabases, as well as Excel files, Comma Separated Value files (CSV), and finally as PDF files if no other file format was available.

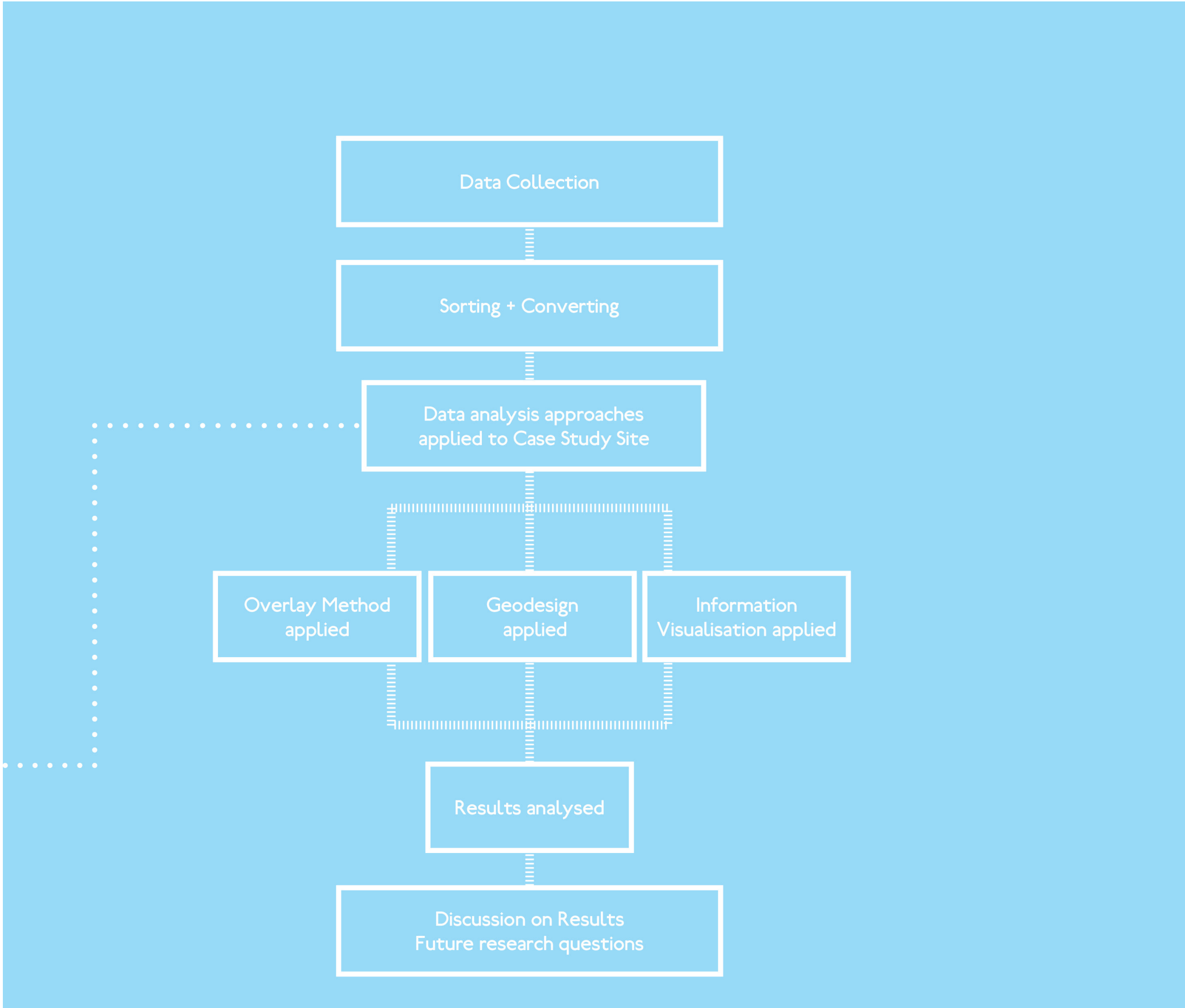


FIGURE 14: Process followed in data stream

IMAGE REMOVED DUE TO COPYRIGHT

FIGURE 15: Care study site (outlined in red) within its central Wellington context.

Image: Google Earth

The case study site covered two 2013 census meshblocks: MB2135300 and MB2135500 shown in Figure 16. In order to obtain sufficient data relevant to this case study, and to provide a relevant context, it was decided that the meshblocks adjacent to these were to be included when collecting data.

As the data collection began, a significant amount of data was being gathered, but there was no direction to it. As I was keeping track of what was coming in, there was no way of knowing what data I was missing or had overlooked. Apart from my own understanding of what data would be helpful or useful, I could not find a definitive list of categories or types of big data for a landscape architect or designer.

The United Nations Economic Commission for Europe's (UNECE) Task Team on Big Data formulated a classification of types of Big Data in 2013, which proved to be a good starting point, but it lacked any detail under the category of data supplied by public agencies. As the New Zealand Government has moved to making more Open Data available, this category needed to be more robust, so the categories from data.govt.nz were meshed into

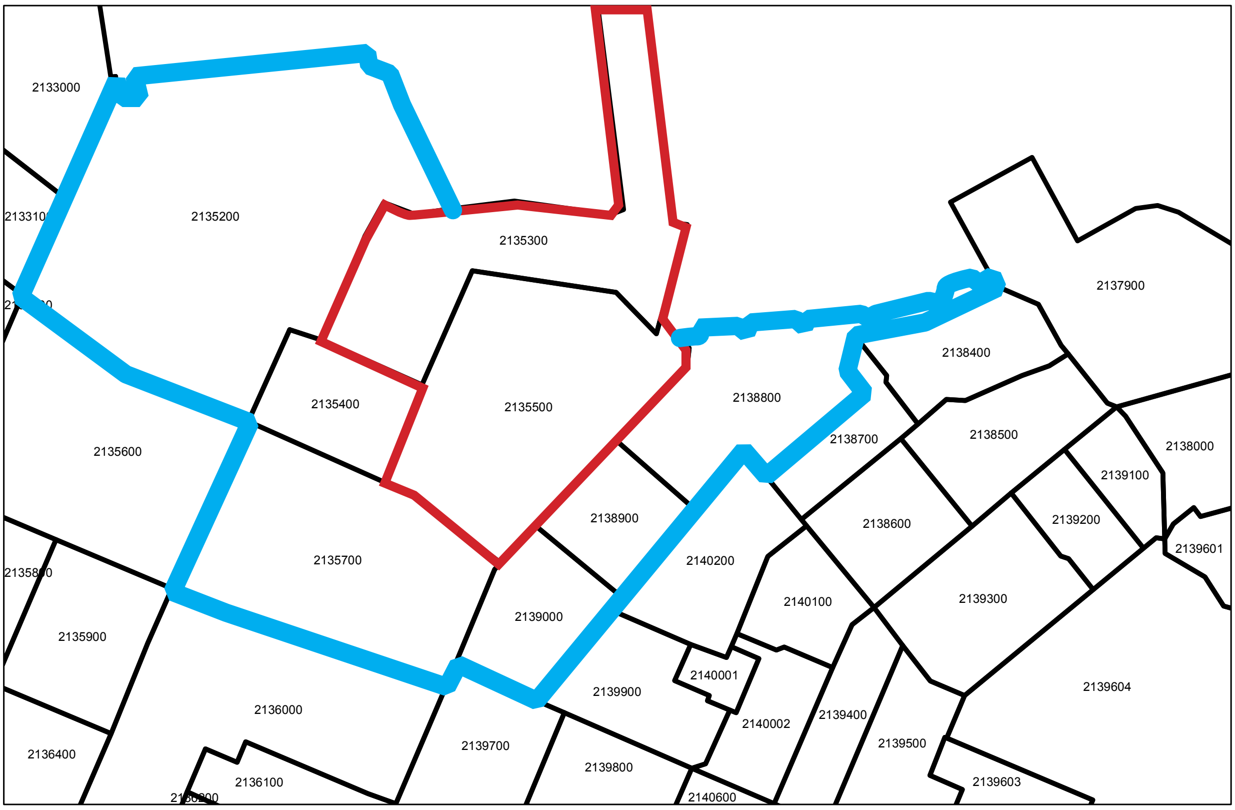


FIGURE 16: Case study site meshblocks (red boundary) with surrounding meshblocks (blue boundary)

the UNECE classification types (Figure 17). The results table was then used as a guideline to target categories that had no data, ensuring further veracity to the data.

	COUNT
100. Social Networks (human-sourced information):	
1100. Social Networks: Facebook, Twitter, Tumblr etc.	
1200. Blogs and comments	
1300. Personal documents	
1400. Pictures: Instagram, Flickr, Picasa etc.	
1500. Videos: Youtube etc.	
1600. Internet searches	
1700. Mobile data content: text messages	
1800. User-generated maps	
1900. E-Mail	
200. Traditional Business systems (process-mediated data):	
2100. Data produced by Public Agencies	
21001. Agriculture, forestry and fisheries	
21002. Arts, culture and heritage	
21003. Building, construction and housing	
21004. Commerce, trade and industry	
21005. Education	
21006. Employment	
21007. Energy	
21008. Environment and conservation	
21009. Fiscal, tax and economics	
21010. Health	
21011. Infrastructure	
21012. Justice	
21013. Land	
21014. Local and regional government	
21015. Māori and Pasifika	
21016. Migration	
21017. Population and society	
21018. Science and research	
21019. State sector performance	
21020. Tourism	
21021. Transport	
21022. Ministers, cabinet and portfolios	
2200. Data produced by businesses	
22100. Commercial transactions	
22200. Banking/stock records	
22300. E-commerce	
22400. Credit cards	
300. Internet of Things (machine-generated data):	
3100. Data from sensors	
3110. Fixed sensors	
31101. Home automation	
31102. Weather/pollution sensors	
31103. Traffic sensors/webcam	
31104. Scientific sensors	
31105. Security/surveillance videos/images	
3120. Mobile sensors (tracking)	
31201. Mobile phone location	
31202. Cars	
31203. Satellite images	
3200. Data from computer systems	
3210. Logs	
3220. Web logs	

FIGURE 17: Proposed categories of big data

4.1.1 Sources

Data was collected from as wide a range of sources as possible to ensure variety, with all of the data coming from online sources. There is scope for future data collection to make use of collecting one's own data from the site / area using sensors or by other means, however for this case study, these were not explored, owing to the time and resource limitations of a dissertation. Figure 18 shows the major category sources of data.

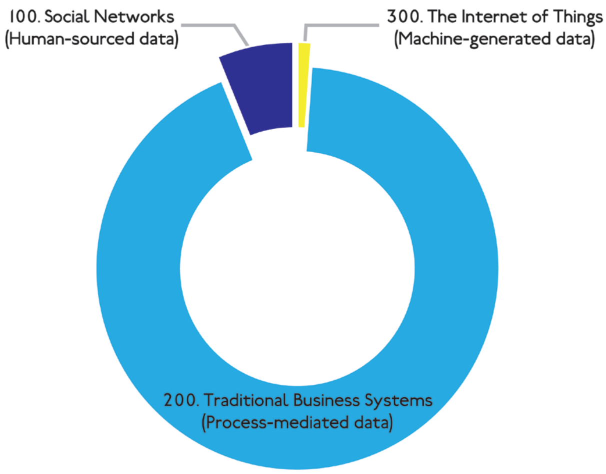


FIGURE 18: Summary of major category sources of data for case study site

When data was not available, there was also the option to submit an Official Information Act request to a Government Agency in order to obtain this data. Under the Official Information Act 1982, agencies are required to respond to any such request within 20 working days and must be released to you unless there is a good reason, for example it would be too onerous to or it may contain information which is under the Privacy Act 1993. After assessing the variety of the data from the various categories, I noted that I had no crime statistics at a fine grain, only data for the Wellington City region. After finding this gap, I could have submitted a request but as this dissertation seeks to answer questions related to practising landscape architects and designers, this avenue were not pursued.

There were other datasets identified that were not available, for example real-time data for Wellington bus services which include travel time, stopping time etc. However, a previous an Official Information Act (OIA) request submitted through fyi.org.nz to the Greater Wellington Regional Council was deemed to be too exhaustive to collate and distribute (Hastie, 2015). Another example included a request for CCTV footage from rail stations to the Greater Wellington Regional Council and the response was given that data from the CCTV camera system on the rail network was typically only kept for 14 days, but depended on how much space was on the hard drive (Hastie, 2014). In these two datasets we see that data is created but not always available in a useable or readily accessible format.

A rich data source is of course – Social Media. I examined the following social media sources: Twitter, YouTube, Facebook, Tumblr, Flickr, Instagram, Google, Picasa, Vimeo and Blogs. I expected to be flooded with data but found that there was a limited amount of data available. There are several reasons for this. First, Facebook is a social network platform and requires access to a user's posts only if they allow it. This greatly restricts the access but by using the hashtag filter #waitangipark, I was able to see posts that had that tag applied then exported these results as a PDF. Facebook was able to display that 5,200 visits had been logged or tagged to this location, however the raw data of this which could reveal time and date, was not available. Second, the use of geolocated social data is limited. An example of this is demonstrated in the screenshot shown in Figure 19 which displays geolocated tweets from around the world in real-time. New Zealand is most notably not well represented when compared to Europe or the Americas and remarkably there were as many geolocated tweets from Tanzania as there were from New Zealand. And third, mining the data from these was time consuming. I could find no freely available tools to make this task more efficient, and relied on my own use of a spreadsheet or PDF export.

IMAGE REMOVED DUE TO COPYRIGHT

FIGURE 19: Map of geolocated tweets. Source: Zajdband (n.d.)

Twitter was another difficult data source for me to access, and tweets that included the hashtag #waitangipark were not all visible via twitter.com. Instead, I resorted to a website, Backtweets.com, to see and export archived tweets as a PDF.

Social media is an important dataset to engage with and analyse as it not only provides a way to see frequency, date information and timing, it also reveals users' behaviours (Abdesslem, Parris & Henderson, 2012).

YouTube was one social media source where I successfully engaged a workflow for collecting results. This workflow began with a Boolean search in YouTube for "Waitangi Park". The results were then exported using a Firefox browser add-on called SEOQuake as a Text file, then these were brought into an Excel spreadsheet, then the .xlsx file was opened in Screaming Frog SEO Spider 5.1. This application ran a process where it gathered all the metadata for each of the YouTube videos and then exported it into a .csv file which was then formatted appropriately and finally saved as an .xlsx Excel file.

Near the end of the data collection phase I realised that although I had obtained a number of datasets from the Population and Society category, I knew that the Social Deprivation Index would be an important and useful dataset. I deliberately sought it out, even though it did not appear in any of the major searches I did. At the end of the three month data collection period I was still stumbling across more datasets and could have continued to collect more but had to set a point at which to stop.

4.1.2 Format

Datasets were collected in their provided formats and sometimes this was conveniently either as .csv files or as georeferenced shapefiles, less conveniently as a PDF, or least conveniently as a non-exportable webpage or online database. The first two file types were preferred as they were easily applied with the data analysis approaches: .csv files can produce charts or tables in Excel or Tableau and georeferenced shapefiles can be directly imported into a GIS software program. The format types are graphed in Figure 20.

Some datasets were only available as non-exportable online databases. One example of this was the land value data for the properties within the meshblock areas, as this was only available as a searchable result from the Wellington City Council website (http://wellington.govt.nz/services/rates-and-property/property/property-search), with each property searched, results were then entered into an Excel spreadsheet (Figure 21). As there were 984 land and property values that had to be entered manually, it was a time consuming task.

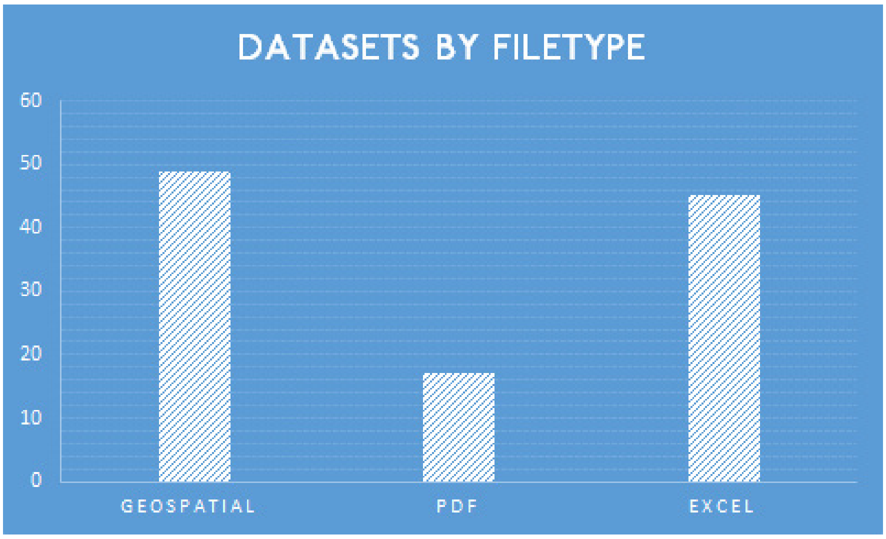


FIGURE 20: Summary of dataset format types for case study site

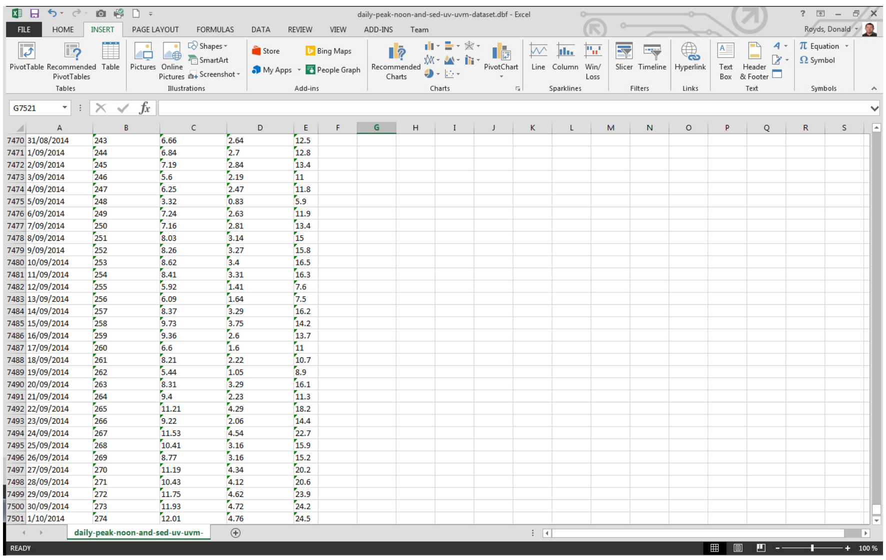


FIGURE 21: Sample of raw data in .csv format in Excel

This could have been avoided if the services of a company such as Quotable Value were used and depending on the costs involved this could be prohibitive to a user – but would still need to be added to a georeferenced shapefile manually.

Some datasets, such as the GeoNet earthquake dataset, were not easy to understand at first as I was unsure exactly what they contained, or how to use them, and it required going back to the original source to go through how it was formatted. This proved to be a time consuming but necessary task to ensure that I could apply this data to an approach.

Raw data was also not always obtainable for each dataset, and sometimes only summary data was provided by the source. An example of this was the Regional Visitor Monitor, provided by the Ministry of Business Innovation and Employment, where they collect a range of visitor information, including planning and booking, accommodation, transport, activities, and environmental perceptions, yet only supply this dataset as score totals across the country.

Real-time data, often gathered as machine-generated data, represents the velocity attribute of big data, and this category was an area where there was little to no data available.

The final comment on formats relates to the use of cells and spreadsheets. I used Microsoft Excel for many of the tasks in this phase but also found Google Spreadsheets were helpful as they provided alternative formulas that worked with online services such as Google or web feeds.

4.1.3 Summary

In summary, the data gathered during the data collection phase for the case study site was comprised of:

- 1.74 GB total folder size of raw and reformatted data;
- 111 individual datasets;
- 49 available as geospatial data
- 17 PDFs
- 45 Excel spreadsheets.

Big data was readily available for the case study site but there were a number of hurdles that were encountered during the process. These hurdles included finding that the formats available were not always easy to use immediately and had to be manually entered or could not be added to a GIS program; some datasets were not available in full and a request to Government agencies would be required; and there were also limited software options for extracting social media data from their original sources.

The number of available datasets in each category (shown in Figure 22) demonstrates where the importance or priority has been placed in regards to collecting and distributing information within the Wellington context. There appears to be more data available in categories such as environment, infrastructure, and land whereas categories such as energy, education and health had relatively fewer datasets available.

Through this data collection process it was identified that there also needs to be a more structured set of categories of big data along with a robust way of collating and recording what it is that has been gathered. There needs to be clear categories to ensure a comprehensive spread over a range of areas to provide breadth, and a way of knowing what sources are available in each category to ensure a good depth to the data also.
Some of the data collected did not go down in scale to just the case study site itself, for example New Zealand Police crime data, but it was useful as it provided a context for the other datasets and the site. Big data doesn't necessarily correlate to site data, but is certainly contextual data.

4.2 Application of data analysis approaches

Having now collected the data for the case study site, the next stage in the research process is to test three data analysis approaches for their efficacy.

Three data analysis approaches were selected from the literature review based on how well they scored in the criteria matrix and these were: the Overlay Method, Geodesign, and Data Visualisation.

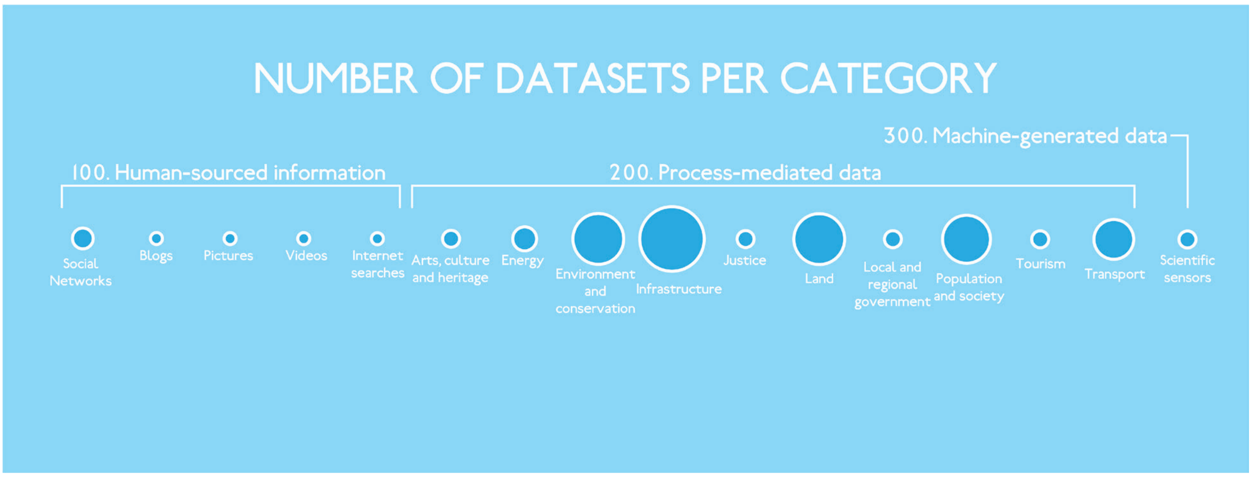


FIGURE 22: Number of datasets per category of big data found for case study site

The GIS software program ESRI ArcMap was the primary tool used in the collation of data the Overlay Method and for the Geodesign approach because of its ability to present site data, in particular basic mapping for the Overlay Method and for its processing tools for the Geodesign approach.

4.2.1 Overlay Method

The Overlay Method relies on maps which show discrete datasets or 'values' to be physically overlaid above each other, with the result showing areas where there are overlaps between them or gaps where the 'values' are not present. This method is a common practice used by landscape architects as it has been used for teaching landscape architecture students (Turner, 2014). It is also an analogue process as the use of computers is typically left out of the analysis and I have only used software to construct basic maps.

Once the georeferenced shapefile layers were added into ArcMap, their transparency was reduced to 50% to aid the 'layering' process, then they were exported as PDF files and printed onto overhead projector transparency film. They were then overlaid into one 'stack'. This 'stack', as seen in Figure 23, shows that there is no useful result. The result was 'muddy', confusing, and does not appear to

FIGURE 23: Overlay Method result: 30 individual layers of data 'stacked'

reveal anything of use. I made a decision at the beginning of this approach that to ensure it doesn't stray into too much digital manipulation that no further colour changes or category 'symbology' would be applied to the layers other than to change the transparency.

As this 'stack' contained 30 layers, I wanted to ensure that the integrity of the film itself was not a factor so placed it on top of a light table yet the result remained muddy. I then went further to separate out the 30 layers into layers of three groupings: line layers, point layers and area layers. These were then examined as individual groups but still the result was a map that revealed little about the data (Figure 24).

4.2.2 Geodesign

The Geodesign approach is synonymous with ArcGIS and so ArcMap was used for the application of this data analysis approach, following the workflow shown in Figure 25.

The first step was to work with the existing shapefile layers that had been used previously for the Overlay Method, the layers which had subcategories (such as values 1-9) were identified and given a colour gradient ramp to display these values in more detail.

Data was not imported into the Geodesign approach if it did not come already in the format required (such as .dbf or .shp). This demonstrated that pre-processing would be required to transform the remaining datasets into usable ones in ArcMap.

FIGURE 24: Overlay Method: Composite groupings using point, line, and area layers of data

In order to begin the data analysis, a series of questions that related to the data and the site were formulated to query the data. The questions that were used were:

1. What other amenities are within a five or ten minute walk of the site? (Figure 26)

2. Where are the surrounding open / green spaces? (Figure 27)

3. How many people live within a five minute walk of the site? (Figure 28)

4. What is the density of the buildings? (Figure 29)
5. Where are the areas at high risk from a natural hazard event? (Figure 30)
6. What infrastructure is at risk from ground shaking hazards? (Figure 31)

Once the questions were set, I then had to identify the relevant geoprocessing tools and workflow in order to achieve an answer to the question proposed.

IMAGE REMOVED DUE TO COPYRIGHT

FIGURE 25: Geodesign workflow diagram. Image: ESRI (2013)

FIGURE 26: Q1 - What other amenities are within a five or ten minute walk of the site?

FIGURE 27: Q2 - Where are the surrounding open / green spaces?

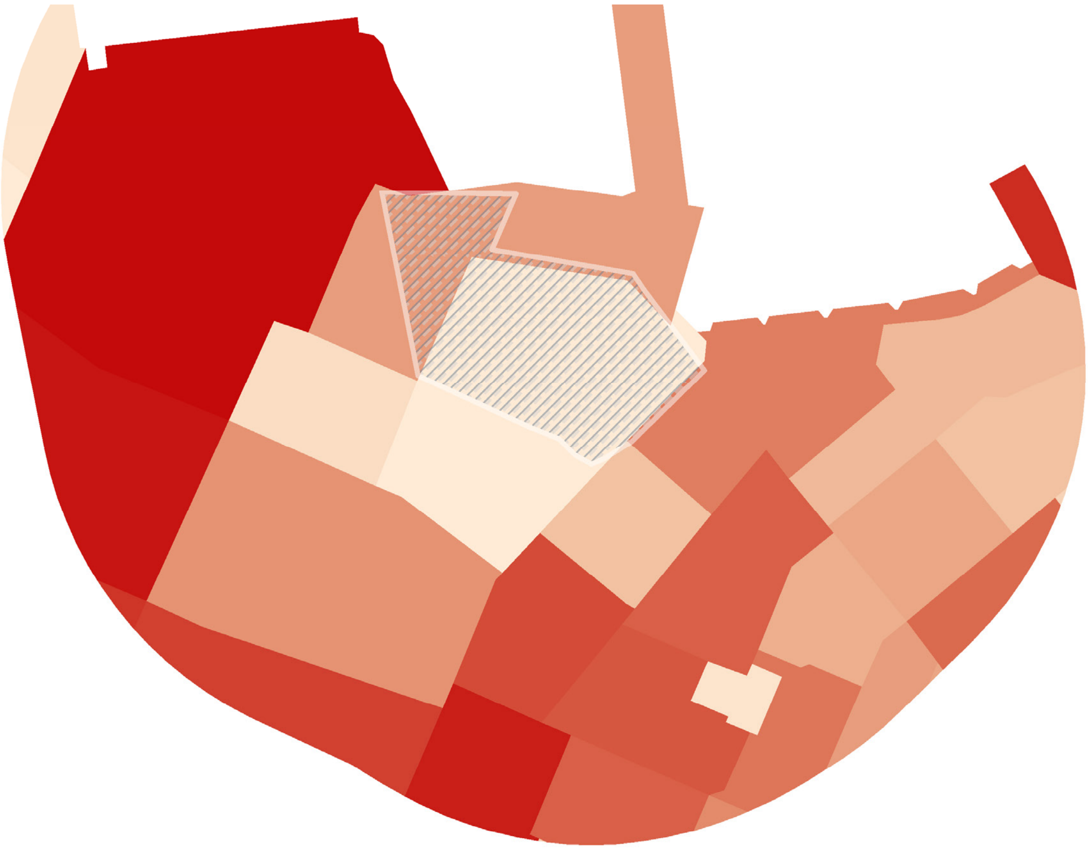


FIGURE 28: Q3 - How many people live within a five minute walk of the site?

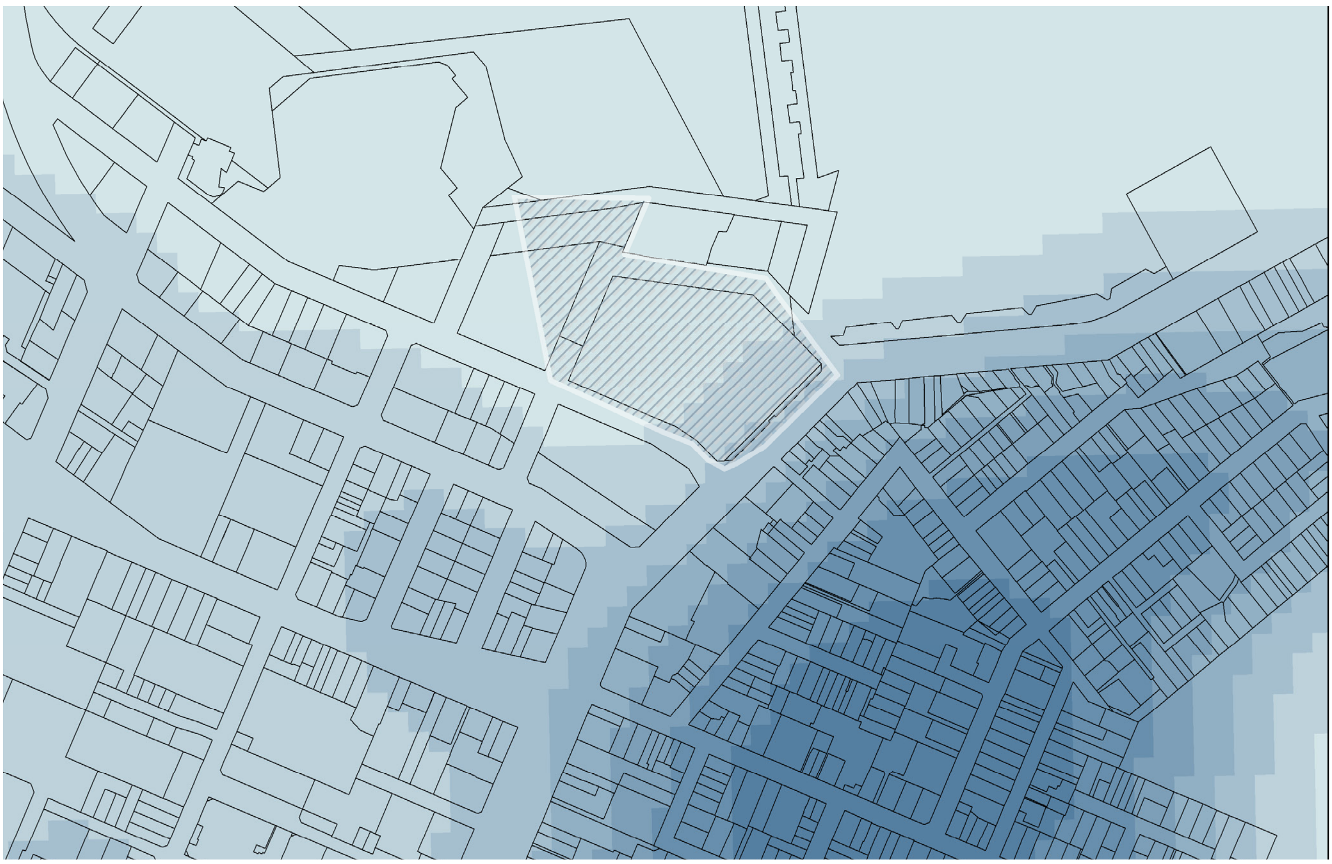


FIGURE 29: Q4 - What is the density of the buildings?

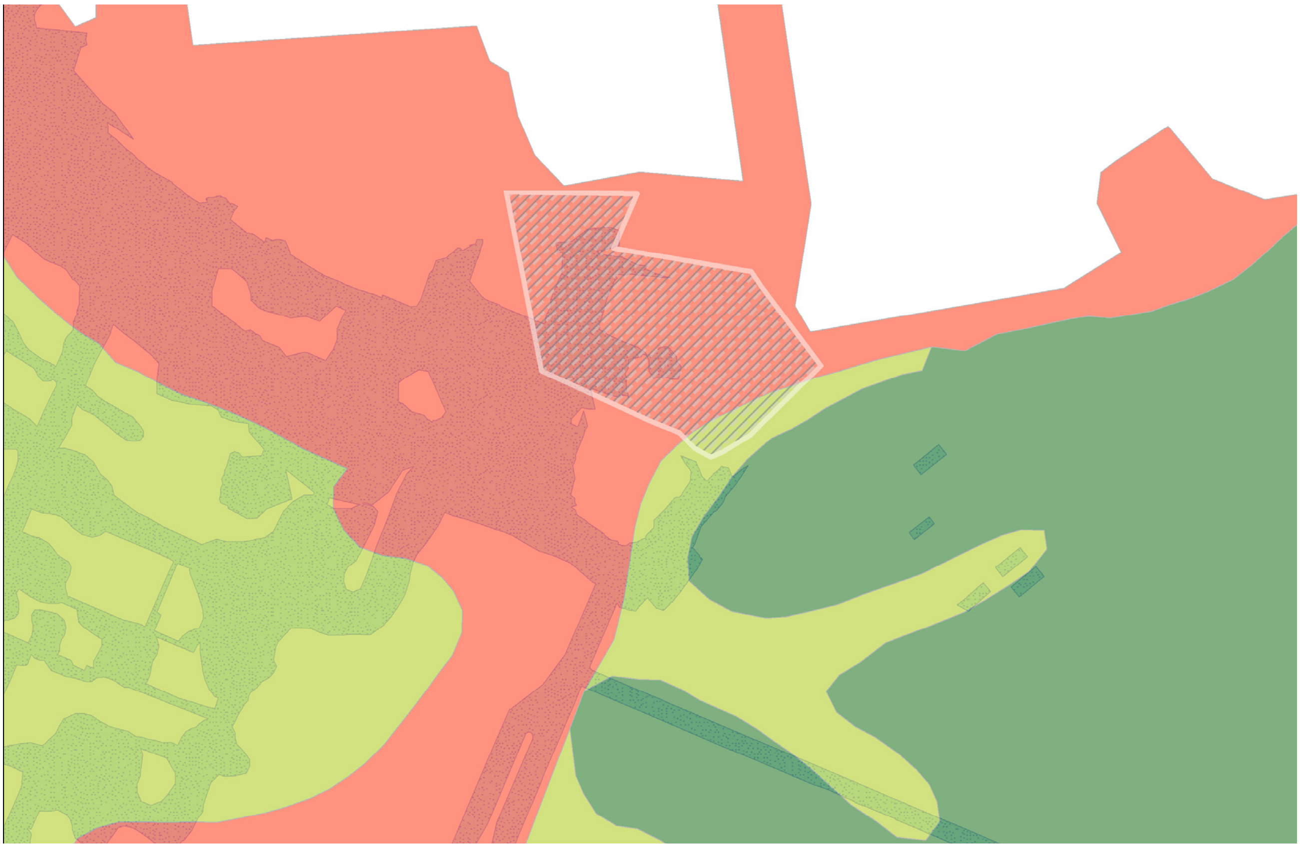


FIGURE 30: Q5- Where are the areas at high risk from a natural hazard event?

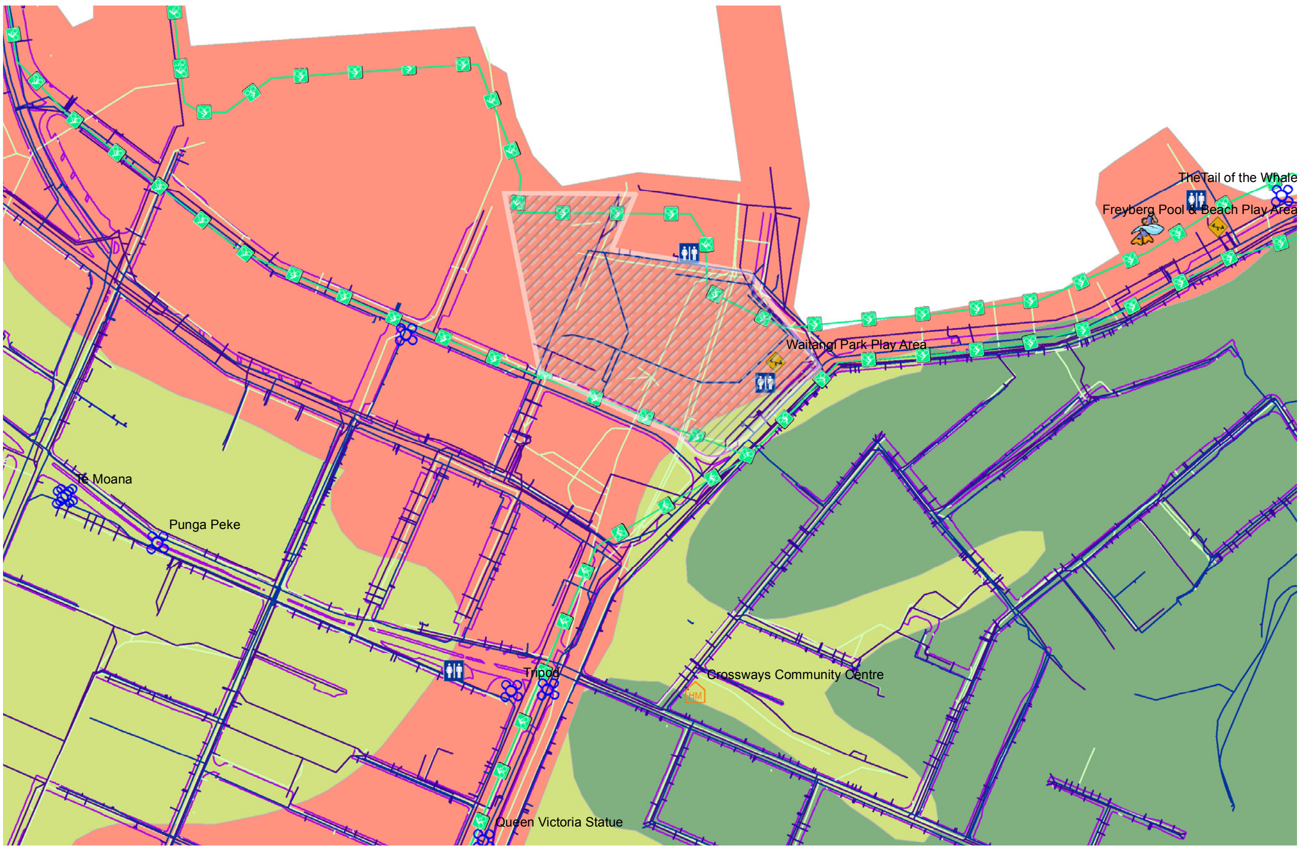


FIGURE 31: Q6 - What infrastructure is at risk from ground shaking hazards?

For question 1, 400 and 800 metre buffers were created from the site boundary and with all the amenity layers visible, this revealed which amenities were within a five minute walk radius (400m) or 10 minute walk radius (800m) (Figure 26). The Near Analysis Table tool also revealed the exact distances to each of these.

Question 2 required the least amount of additional analysis as the open space was visible on a single layer as a dataset. Land parcels and meshblock layers were added for context as well as the labelling of each open space.

Question 3 sought to identify the residents were concentrated within a five minute walking radius from the site. This could help to reveal possible circulation patterns and which routes larger volumes of users would use.

Question 4 had the most surprising result from the analysis. At first I thought it would be interesting to show density as site coverage by built forms but this could not be achieved with the current geoprocessing tools (that I could understand), but then the next option to show density was to look at how many buildings, regardless of size, and within an area. The geoprocessing tools used were 'Feature To Point', which converted the building footprints to points, then Point Density to then calculate and visualise the density of building points per square kilometre. The result showed that building density increased in the direction of Mount Victoria to the south east of the site. This is likely due to the high demand for the views that such a location affords, along with the age of the buildings in the area being older (and naturally smaller). Buildings closer to the city centre were larger but contained more apartments and retail shops hence the lower building density.

Question 5 required me to identify which natural hazard layers could contribute to high-risk factors, and with experience from the Canterbury earthquake sequence of 2011-2012, the most relevant earthquake layer was deemed to be the ground shaking layer, and this was then layered with the flooding hazards. As this was still not the clearest way of showing where the highest risk areas were, I used the Intersect Tool to show where the highest ground shaking and flooding hazards would be likely to occur, then turned on the property boundaries layer for context (Figure 30).

Question 6 was another natural hazard question which relates to the lessons learnt from the Canterbury earthquake sequence. The lesson from this event was that infrastructure such as road, pipes and kerbs, were damaged more by liquefaction than by the ground shaking itself. So to answer this question I made all the infrastructure layers visible (kerbs, storm water pipes, wastewater pipes, water network, water service pipes, amenities and cycle routes) and made the liquefaction layer visible. The liquefaction layer had three levels of risk associated so red was applied to the highest risk of liquefaction, yellow to medium risk, and green to the lowest risk of liquefaction. The resulting map (Figure 31) reveals that most of the waterfront (reclaimed land) and its associated infrastructure, is at a high risk of damage during an earthquake event.

At the end of the data analysis there were six maps produced which provided a geographical understanding for the topics covered by the original six questions, along with a working GIS file which could be further scrutinized. Had a design brief or client been part of this process, it could have provided further direction to question of the data.

4.2.3 Data Visualisation

The workflow that I followed for applying the Data Visualisation approach was to first go through all the available data by reading the rows and columns of data or text of a PDF file. I then went back through the data to review all the terminology and attributes and investigate these items further from their sources if I did not feel I understood them and their context. Next I used Excel or Tableau to interrogate the data through interim charts or graphs, and cognitively processed the lines of information looking or patterns or items of interest. These were then summarised and presented graphically as an Infographic.

This data analysis approach proved to be the most challenging for me to apply – not because of its complexity but because it used a process I had not been exposed to before. Despite experts in this area such as McCandless, Tufte and Yau writing extensively on this topic, there was little guidance to suggest a standard process to follow and this meant that the process I ended up following was an organic, explorative one.

This approach relies on the cognitive processing ability of the brain to spot and associate patterns or trends in data that computational algorithms can't, but in order to do this, a great deal of time must be invested in getting to know the data. Part of this time challenge is simply going through line by line in spreadsheets, but a large part I found was also deciphering and decoding technical classifications. For example, for the UV datasets provided by NIWA, the data was supplied in units of DUs or Dobson Units, and I then needed to understand what the significance of these units increasing or decreasing. What I was able to then find out was that 1 DU is equal to a 1 millimetre thick layer of ozone over a specific area in the stratosphere. This was useful as I could then understand the significance of a low DU measurement as I was able to compare it to the global average of 300 DU (Newman, 2013).

I explored different ways to display the data that was converted from YouTube metadata into an Excel file, and found that a simple iconographic approach worked to summarise the key, and amusing, data as shown in Figure 32.

I used Tableau to help me explore the datasets further than Excel could and I found it to be intuitive with limited practice. It did however require at least one common field to create a join between to datasets but did have features such as Data Cleaner which reduced the time required to reformat files.

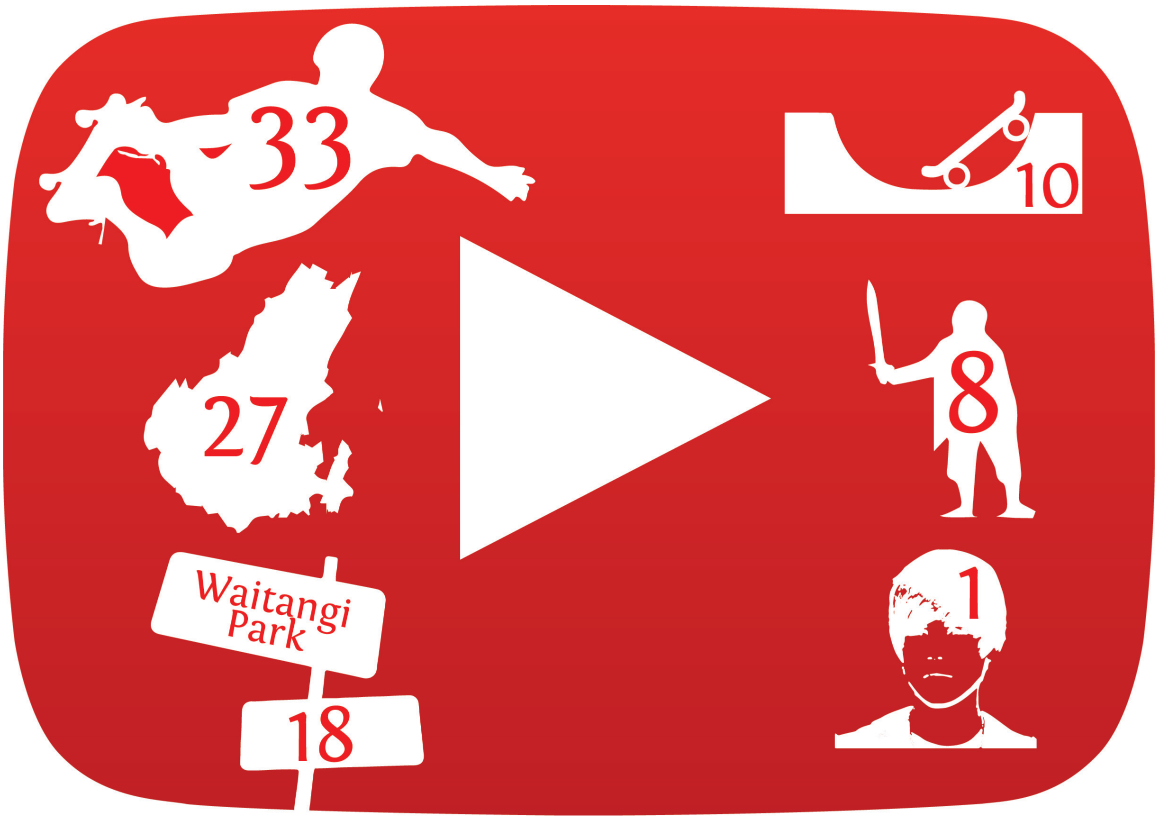


FIGURE 32: YouTube Infographic created from keyword metadata

One process which I had not come across, but instinctively came up with was to take all the keywords that people used keywords to describe themselves from a dataset (Litmus, 2011), then put those into an image search and then the images which were tagged of individuals were collated into a single image (Figure 33). This final image revealed who the site users might be, without requiring me to take photos of actual users.

Taking all the minor graphs, graphics that were produced throughout the process, along with other patterns of interest, I summarised and combined these into one final data visual usual a template developed by Yau (2011) as shown in Figure 34. Further refinement of this process would be beneficial and level of graphic understanding would be required to gain maximum effect. The final result however does provide the viewer with a 'dashboard' of sorts, with a variety of information available in one glance, which can then be investigated further.

4.2.4 Summary

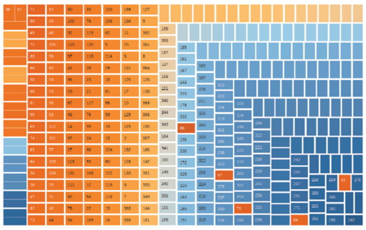
The Overlay Method, while widely practised, does not have the capacity to work with big data. This was demonstrated by adding only 30 layers of information with no usable outcome, being obscured through physical stacking, and when the layers were separated out into the layers with point and line data it was almost just as illegible.

As data layers were added to ArcMap, the datasets that contained more than one category or field had their symbology displayed as a red to green colour ramp which helped to identify any compound effects, especially as each area dataset had a transparency of 50%.

A weakness in the Geodesign approach is that in order for any analysis to begin, there needed to be an appropriate set of questions that required answering. While this does provide a starting point, it can overlook other patterns that are not apparent and narrow the analysis too quickly.

FIGURE 33: Faces of Wellington: how users of the area describe themselves

WAITANGI PARK INFOGRAPHIC



49% of the year, the Ozone layer is less than the global average

NZERS USE GEOLOCATED TWEETS AS MUCH AS TANZANIANS

Unrestricted Dog exercise areas
86%

Crime is down
65%

Average Age
35

85% in upper 50%
15% in lower 50%
Socioeconomic Deprivation

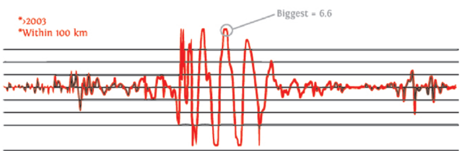
5,700 VISITS LOGGED VIA FACEBOOK

PEOPLE WHO WORK IN THE AREA...

7% Live there

60% Jogged or walked there

Came from Lambton Quay



140 Earthquakes

FIGURE 34: Site Infographic (based on Yau, 2011)

Although software programs and open source software was used, no coding or scripting was used as this would not usually be an expected skill of a landscape architect.

Methodically going through a lot of technical jargon slowed down the analysis of the data under the Data Visualisation approach as there were some very specific codes and classifications to comprehend. This was an exploratory process and there were many new areas that required an investment of time – which could be an obstacle in applying it in a working environment. It did however provide an approach that could include more geospatial and non-spatial data than the other two approaches.

5.0 Discussion

Each of the three data analysis approaches had their merits.

The speed by which the Overlay Method could be applied was a positive and results were achieved in the shortest time out of the three approaches. It was intuitive, and placing the layers into stacks or groupings was an engaging part of the process– even if the result meant that not much sense could be made of it.

As this approach was intended to be analogue, and because the output was too unclear, there was no further meaningful or useful analysis that was achieved from this approach with the layers obtained.

I reached a similar conclusion in a recent project looking at a Structure Plan for Central City North (Christchurch), as part of a studio project in the taught masters (LASC 617). In this project I looked at five layers of data and what role hierarchy played. The location of a layer in the stack was directly related to how visible or prominent that value would be and that by rearranging the layers, different information would become more either hidden or seen. For example, in Figure 35 the layers of land condition, hydrology, green space, social deprivation and movement were arranged in that order (left), however, when that order was reversed there was very different hierarchy to what was now visible (right). The original order revealed more about landscape systems and less about people, whereas the reversed order showed more about people than landscape systems. How the order was arranged bore greatly on which data was used to inform site-based decisions.

Geodesign was able to deal with both a large number of datasets and datasets with large data, but could still only work with geospatial data. To include the variety of datasets that big data is available as, would be an area for improvement. It should be noted though, that there is constant improvement in the software, hopefully to cover this obstacle as well as incorporating multiple file type inputs. GeoEnrichment is the latest advancement, albeit still in its early stages, where there has seen some movement towards melding geospatial and non-spatial information (Figure 36). It aims to incorporate statistical data with the 'map view' but does so in a crude and disjointed way. This attempt to pair non-spatial data with geospatial data is not convincing.

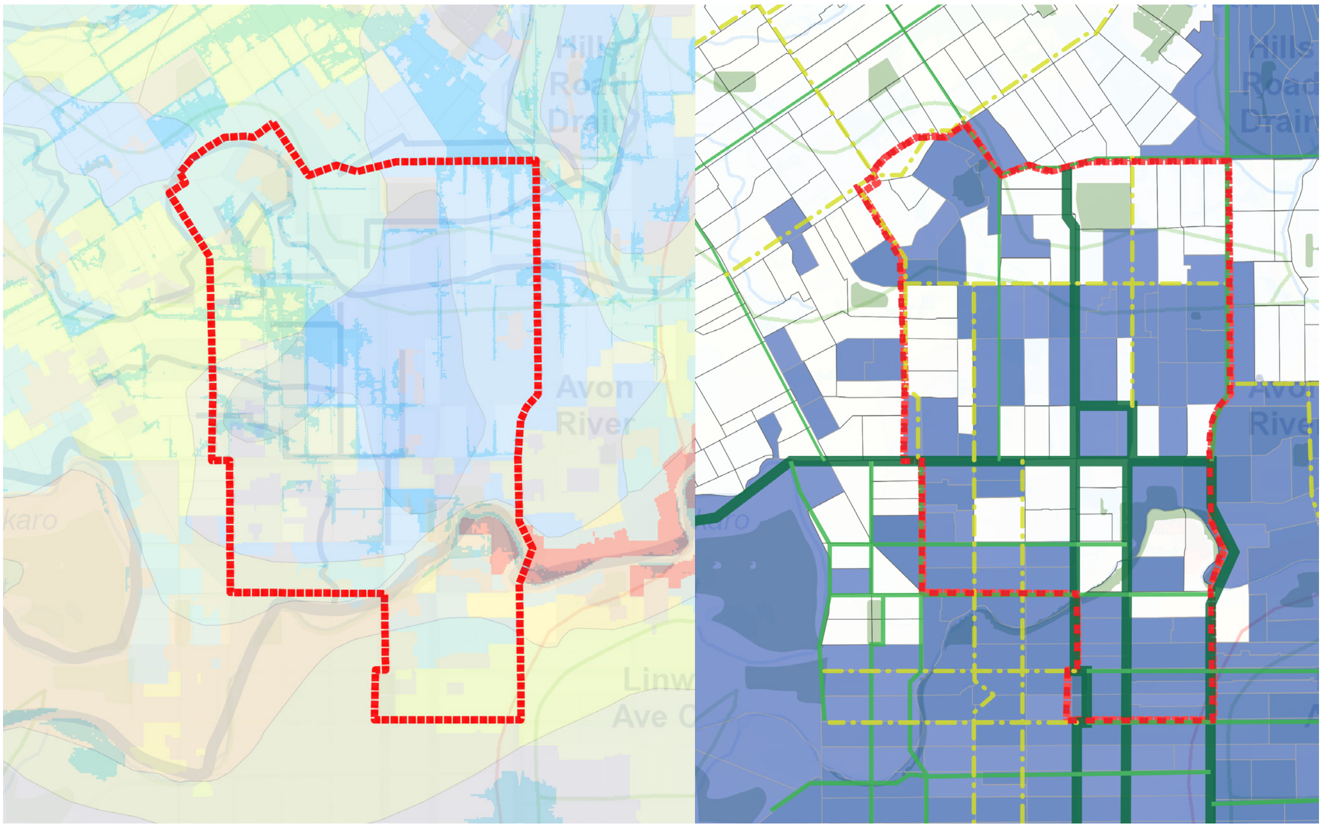


FIGURE 35: LASC 617 layers – original order (left) and reversed order (right)

IMAGE REMOVED DUE TO COPYRIGHT

FIGURE 36: An attempt to pair non-spatial data with geospatial data - GeoEnrichment. Image: ESRI (2013)

Specialist computer programs were not featured in this case study as it was decided to keep this process as close to what would be carried out in landscape architectural practice as possible. Microsoft Excel was used extensively and since it is common in most offices around the world this piece of software will be the most accessible. Also used was the incorporation of GIS software with ArcMap for both the setup of the Overlay Method and for carrying out the analysis within the Geodesign approach. There was the reliance on my own prior knowledge and investigative judgment as to which geoprocessing tools were available within the program to answer the questions effectively. There currently is a limited set of tools available and there are gaps which require work to close (Miller, 2012). Tableau Public and Adobe Illustrator were also used in the preparation of graphics for the Data Visualisation approach.

One aspect of the case study which I had underestimated, was the time required to read through and 'know' the data. This was of course a large component of the Data Visualisation approach and it was required for each step of the process as this was my first foray into obtaining big data instead of traditional site data collection methods and this required more time to learn. This time was necessary to understand the data: how it was collected, how it was formatted, and what the technical classifications meant. This could not be part of an automated process as it would have limited my ability to engage with the data and rely on cognitive processing.

It could be argued that the order in which these three data analysis approaches were carried out could have produced different results, for example, if the Data Visualisation approach was carried out before the Geodesign approach then perhaps I could have been more aware of the data and have asked either more specific questions or that the questions could have probed the data deeper. Regardless, it was apparent from this case study that more patterns and relationships were revealed in the Data Visualisation approach than in the other two approaches.

The Data Visualisation approach relied on personal discernment and judgement; to see what I saw or to see what I 'wanted' to see. On the positive side, this allows for customisation in response to a brief. However, there is also a potentially negative dimension in that it has the potential to be manipulated for a particular bias or for someone to make selective interpretations. Regardless, it was a creative and stimulating process to undertake. I began to see the data in new ways and thought laterally about not just how to show what I had found, but how it could be viewed from another angle or reveal its significance.

At the conclusion of the case study I felt very connected to the site and surrounding area. I did however feel that I couldn't fully absorb many of the datasets as there wasn't a context of how they compared to other regions within NZ, and had this comparison been included then it might have helped. The connectedness that I did experience though could have been amplified if I had visited the area or knew it well before starting the data collection and analysis as it could have directed me to search or collect data based on observed / perceived nuances of the area.

Had this case study been applied to a specific project with its own design brief, then particular data could have been requested or obtained in order to align with the requirements of a designer or client, but this was not the situation for this case study.

The physical handling and storage of the collected big data was not a difficult task as the total data collected for the case study was 1.74 GB – which was easily stored on a USB pen drive and in a cloud-based service (Dropbox.com).

Beyond the data collection phase, I found that I was constantly stumbling across new sources of data, which I wished I had known about earlier but couldn't now include – for example CliFlo which is the National Climate Database. This also reinforces the notion that the collection and analysis of big data could be more efficient as the task is repeated.

Big data could be part of a useful discussion within the education of landscape architecture students by demonstrating how exploring data analysis methods through visual representations, it could lead to an improved understanding of a site and its context, and could inspire sustainable and creative design process.

5.1 Summary

The Overlay Method is not suitable for big data – unless it is broken down into lots of grouped maps – and does not facilitate a robust understanding of the data.

Geodesign is suitable for big data – but only geospatial data. It presently cannot deal with anything that does not have coordinates. If the right questions were asked, and if the geoprocessing tools exist, then the results can be useful.

Data Visualisation is suitable for big data – but it does require an investment in time. It can convey large amounts of data quickly or just the 'juicy bits', and has the potential for the misrepresentation of data through individual interpretation. It has some scope for working with both geospatial and non-spatial data.

To conclude, there was no clear approach that dealt with big data sufficiently or with an acceptable efficiency, and it is evident that a different or hybrid data analysis approach is needed to incorporate both non-spatial and geo-spatial data.

This gap will be discussed further in the next chapter.

6.0 Mind the Gap

As previously identified, there is a gap between the two most applicable data analysis approaches – Geodesign and Data Visualisation – and there is currently either a weak or non-existent bridge over this gap, as shown in Figure 37.

There is no doubt the temptation to simply 'slam' the two approaches together, such as the GeoEnrichment platform does, does not provide a sufficient answer as it relies on machine processing, as Mazza (2009) has already shown, is best achieved through human cognitive abilities. The immersing of the user into the data is also fast-tracked and it is not clear how limiting this could be to understanding the data.

The role of data visualisation, particularly Infographics, is more prevalent with how Statistics New Zealand provide some of their summary data. Not only do they produce more interactive datasets (Figure 38) but also in the form of infographics, such as Figure 39, where summary data has been used in 50-year blocks for Wellington city.

There is more scope for the use of interactivity and real-time input for bridging this gap, but this could dilute the efficacy of the infographic which works best when all of the summary data visuals are displayed in one combined area – as opposed to hiding away waiting for a mouse click or mouse hover. Cheshire and Uberti discuss interactivity when they looked

FIGURE 37: The Gap

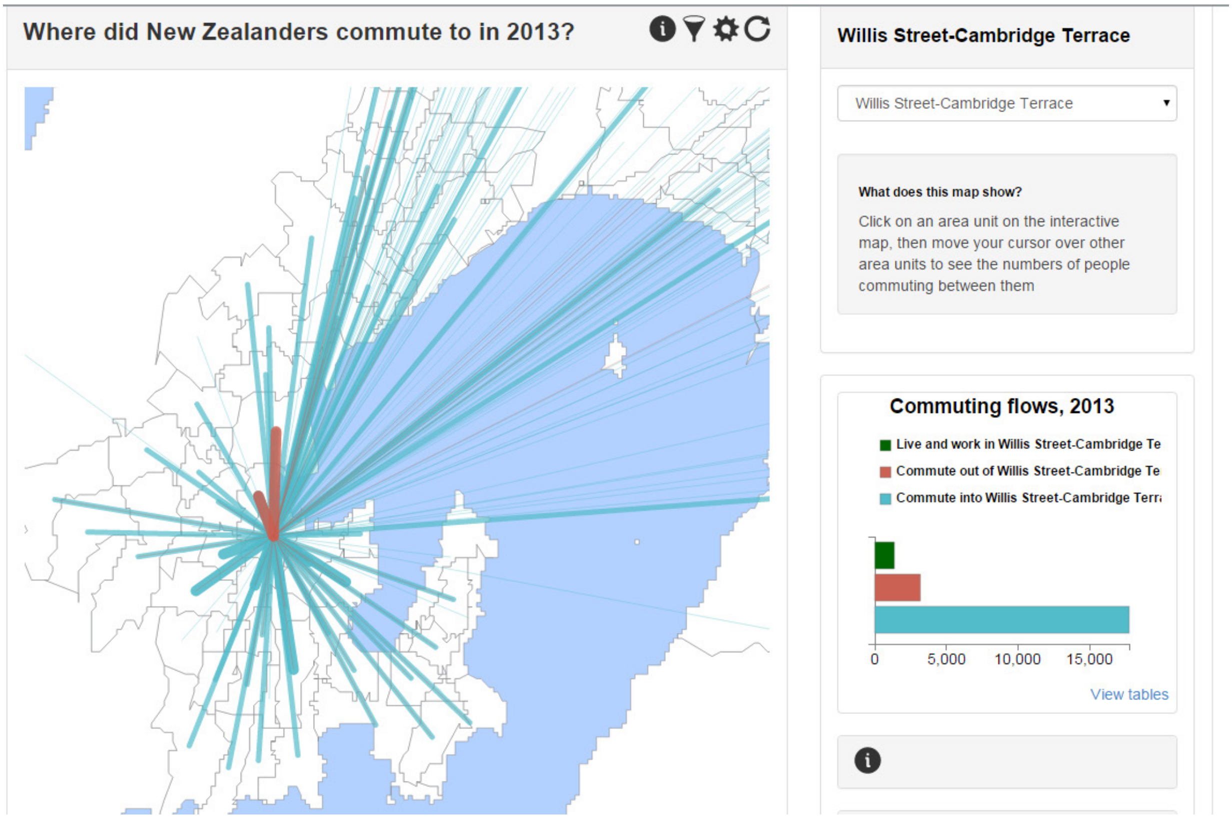


FIGURE 38: Statistics New Zealand make use of an Interactive data visualisation to show journeys of Wellington commuters. Source: http://www.stats.govt.nz/datavisualisation/commuterview/index.html

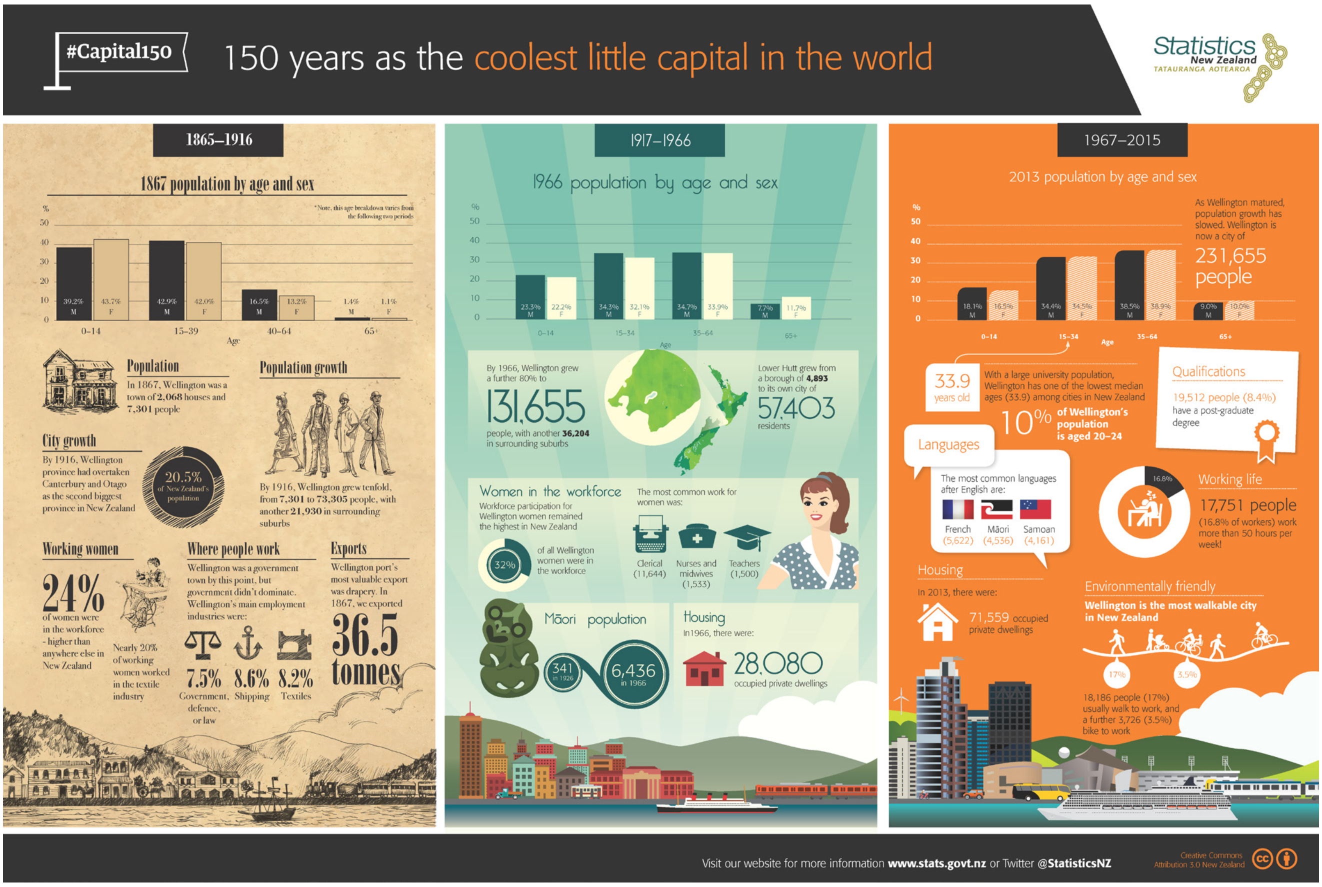


FIGURE 39: Statistics New Zealand Infographic to show 150 years of Wellington statistics. Image: Statistics New Zealand (2015)

at making their data visualisations interactive and their conclusion was "you can simply see more at a glance on a printed page than you can pinching, tapping and scrolling on a smartphone screen" (2014:28).

We could look to blur the two ends of the spectrum perhaps. Could Geodesign become more infographic? This has certainly been the aim of the GeoEnrichment application. Can infographics become more geographic? Could there be a way to blend the two but still maintain the ability to adjust the balance so that on one project it could be more spatial and less infographic?

There are also many small software-related tools for analysing and visualising data. This is something others may wish to evaluate, e.g. Google Correlate, Google Refine, Ruby scripts within browsers, d3.js and InfoVis which are JavaScript-based toolkits. Anselin, Syabri & Kho (2006) have put forward a program called GeoDa and proclaim that it has the ability to be the displayer of both qualitative and quantitative data. Old (2002) proposes that the use of 'substrate' can transform geo-spatial into spatial information and would help span the qualitative – quantitative divide. DeLyser & Sui have even gone so far as to suggest that Lefebvre's idea of rhythmanalysis "can help cross the qualitative – quantitative chasm by connecting multiple scales, senses, and domains" (2013:299). There could be some investigation into this idea, particularly in geographic research, yet we still to move away from formulas and set processes to look at data and "let the dataset change your mindset" (Rosling, 2006).

Landscape Urbanism proponents often present experimental graphics that attempt to lean across from both sides of the gap, albeit only as part of the presentation phase. As demonstrated in Figure 40, a graphic produced by Corner & Allen (2001) for Downsview Park, Toronto, displays maps and layers in the same space as non-spatial information such as flora-fauna relationships and temporal transitions.

IMAGE REMOVED DUE TO COPYRIGHT

FIGURE 40: Landscape Urbanism graphic showing use of spatial data and data visualisation. Image: Corner & Allen (2001)

There has also been a discussion on whether data visualisations and infographics are dead (Gifford, 2013), while others think that these have moved on and become more corporate (Wilson, 2015). For others, data visualisations are very much alive and will forever be relevant forms of communicating data (Windels, 2015; Hughes, 2015).

A possible way forward could be the idea of a dashboard – much like the inside of a cockpit where all the relevant and important information, along with relationships and patterns, are clearly and quickly visible. Further investigation into a particular point of interest could be carried out. It would be advantageous, as mentioned earlier when discussing interactivity, as all the information would present in one discrete area. It could however disadvantage a user by overwhelming them if they were using it for the first time, or if they preferred to go through the data in small, bite-sized pieces. Perhaps the means by which to work with this dashboard is more about the interface itself, whether it is a mix of digital and analogue, or 3D with the aid of a headset or Google Cardboard.

It could also be that the blending or combining of the two data analysis approaches is not the best way to think of finding a solution. The process of applying one approach followed by the other, as in my case study, revealed the merits from such a process and this is something that could be explored further, as shown in Figure 41.

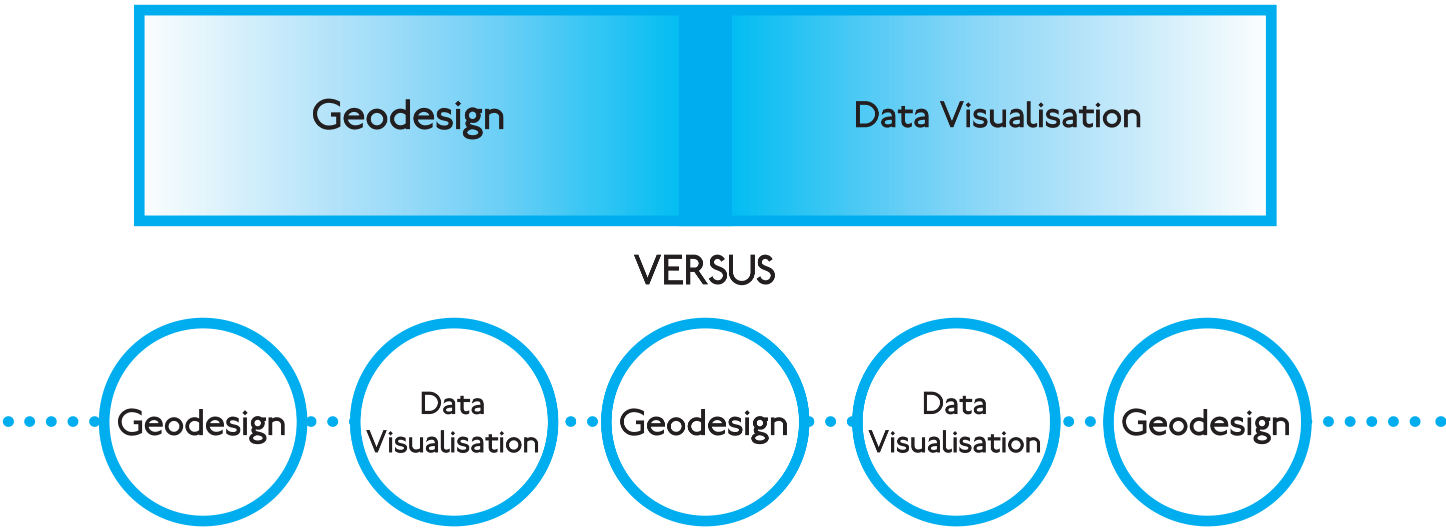


FIGURE 41: Geodesign and Data Visualisation combining versus an alternating process

Or we could teleport into the future with Novich & Eagleman's vest and train ourselves to build new senses – possibly even the 'sense of data'.

IMAGE REMOVED DUE TO COPYRIGHT

FIGURE 42: Eagleman wearing the vest which enables a brain to process encoded vibro-tactile information through the skin. Image: Eagleman (2015)

7.0 Conclusion

My research focussed on a case study site, Waitangi Park in Wellington. For this site I exhaustively gathered data, and the analysed it using three data analysis approaches: Overlay Method, Geodesign, and Data Visualisation. This investigation revealed a range of findings about big data, its analysis, and landscape architecture's current potential to deal with big data. As was demonstrated through a case study, there are approaches to analyse the large number of datasets available to landscape architects when working with a specific site (depending on scale and location).

The application of the data analysis approaches in this case study would be different if the study site was in another country where open data such as those from government agencies, was not freely available.

Context was an observed advantage during this case study in using big data in landscape architecture. Site data can limit a landscape architect if the surrounding community and environment have not been included in the site's story that the data tells.

The Overlay Method was shown to not be appropriate to work with big data, and whilst the Geodesign and Data Visualisation approaches were not able to be complete in their analysis of big data, applying the two in a sequence proved to be a strategy which dealt with the dichotomy presented between geospatial and non-spatial data.

For landscape architectural practices there is the potential for a dedicated staff position, much like a data scientist but with a background in landscape, to specialise in this area to build up a company's knowledge and skillset more efficiently. This would more likely to occur within larger design offices, which are also likely to be multi-disciplinary – another area in which these skills are vital. Or perhaps as Walliss & Rahmann (2016) noted, it is time to expand the skillset of landscape architects to include data analytics, along with critical thinking, to engage with the big data.

Some of the questions which have emerged from this dissertation are:

1. Can the gap between the analysis of geospatial and non-spatial data be bridged effectively?
2. What are the risks for landscape architects in using big data?
3. Could the interface play a bigger role in analysing big data for landscape architects?

This topic of what tools are available for landscape architects to work with big data can be returned to when there are new techniques. A revisiting could also entail a survey of which approaches are popular and why, amongst practising professionals along with a review of the data analysis approaches plotted in Figure 10 and whether they can keep up with the increase in the volume, variety and velocity of big data.

The big data categories and classification could be revisited in further research to ensure that they are robust and look to refine them as technology advances. Further research could also look into whether a user's efficiency in collecting and processing big data increases over time – to see if the user's time decreases for the task as they become more aware of how to work with the various sources, formats and workflows.

There are various software programs available, for free or for purchase, to assist with either the obtaining or analysing of the data. There were limited options for extracting or mining data from social network categories of big data but this could be revisited when more become available. Along with Tableau Public, there are a wide range of software programs or platforms for Data Visualisation, such as Google Correlate, Google Refine, Ruby scripts within browsers, d3.js and InfoVis, and these could be evaluated against their potential for bridging the gap between geospatial and non-spatial data.

We need a continuation of everything open – open data, open government, open source, etc. to ensure that decisions can be well-informed, resources allocated sustainably, and to ensure social equity.

We are moving away from just maps and if we are thinking about going deeper into Data Visualisation, we may need to learn some code just like some students are learning at schools across New Zealand, as in Figure 43.

Big data's greatest gift to us will be helping us to understand our environment, our people and our landscapes better and to make well-informed and empowered decisions.

Big data has been described as the single most important ingredient for creating 'Smart Cities' (Townsend, 2013). If this is true, and Smart Cities are a definite direction we need to focus on, then we cannot afford to avoid the topic of fully understanding and analysing big data for site design.

Are there tools that landscape architecture can use to deal with big data? Yes. Do we make use of them? Not to any great extent, and one thing is clear: we cannot ignore the tsunami of data that is building. We need to find meaningful, enriching and relevant ways to collect it, understand it, analyse it, and design with it.

When it comes to landscape architecture and big data, it is crunch time.

IMAGE REMOVED DUE TO COPYRIGHT

FIGURE 43: What could the future of interfaces with big data be if coding is a basic literacy in education? Image: GeekGirl3.141 (2014)

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9.0 Appendix

UNECE big data classification types

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Big Data / Big Data in Official Statistics

Classification of Types of Big Data

Created and last modified by Steven Vale on 27 Jun, 2013

The following classification was developed by the Task Team on Big Data, in June 2013. Comments and feedback are welcome.

1. Social Networks (human-sourced information): this information is the record of human experiences, previously recorded in books and works of art, and later in photographs, audio and video. Human-sourced information is now almost entirely digitized and stored everywhere from personal computers to social networks. Data are loosely structured and often ungoverned.

1100. Social Networks: Facebook, Twitter, Tumblr etc.

1200. Blogs and comments

1300. Personal documents

1400. Pictures: Instagram, Flickr, Picasa etc.

1500. Videos: Youtube etc.

1600. Internet searches

1700. Mobile data content: text messages

1800. User-generated maps

1900. E-Mail

2. Traditional Business systems (process-mediated data): these processes record and monitor business events of interest, such as registering a customer, manufacturing a product, taking an order, etc. The process-mediated data thus collected is highly structured and includes transactions,reference tables and relationships, as well as the metadata that sets its context. Traditional business data is the vast majority of what IT managed and processed, in both operational and BI systems. Usually structured and stored in relational database systems. (Some sources belonging to this class may fall into the category of "Administrative data").

21. Data produced by Public Agencies

    2110. Medical records

22. Data produced by businesses

    2210. Commercial transactions

    2220. Banking/stock records

    2230. E-commerce

    2240. Credit cards

3. Internet of Things (machine-generated data): derived from the phenomenal growth in the number of sensors and machines used to measure and record the events and situations in the physical world. The output of these sensors is machine-generated data, and from simple sensor records to complex computer logs, it is well structured. As sensors proliferate and data volumes grow, it is becoming an increasingly important component of the information stored and processed by many businesses. Its well-structured nature is suitable for computer processing, but its size and speed is beyond traditional approaches.

31. Data from sensors

  311. Fixed sensors

    3111. Home automation

    3112. Weather/pollution sensors

    3113. Traffic sensors/webcam

    3114. Scientific sensors

    3115. Security/surveillance videos/images

  312. Mobile sensors (tracking)

    3121. Mobile phone location

    3122. Cars

    3123. Satellite images

32. Data from computer systems

  3210. Logs

  3220. Web logs

data.govt.nz categories

(/)

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The new **beta.data.govt.nz (http://beta.data.govt.nz/?utm_source=live_link&utm_medium=dgn&utm_campaign=dgn_beta_0616)** site has been released - tell us what you think (https://www.govt.nz/browse/engaging-with-government/feedback-on-beta-data-govt-nz/?utm_source=live_feedback_link&utm_medium=dgn&utm_campaign=dgn_beta_0616).

Featured Datasets

Government Consultation Listing (XML, JSON) (https://data.govt.nz/dataset/show

Injury Statistics - Work-related claims (CSV, Spreadsheet, HTML) (https://data.govt.nz/dataset/show

Sport NZ Group investments 2013 - 2014 (CSV) (https://data.govt.nz/dataset/show

New Zealand Gazette (XML, JSON) (https://data.govt.nz/dataset/show

Recently Added Data

IPONZ Design Information API (/dataset/show/5709)

IPONZ Discussion Correspondence API

Categories

Agriculture, forestry and fisheries (search/?CategoryID=1&q)

Arts, culture and heritage (search/?CategoryID=2&q)

Building, construction and housing (search/?CategoryID=3&q)

Commerce, trade and industry (search/?CategoryID=4&q)

Education (search/?CategoryID=5&q)

Employment (search/?CategoryID=6&q)

Energy (search/?CategoryID=7&q)

Environment and conservation (search/?CategoryID=8&q)

View less

Sample dataset: Vehicle count

Road Name (and ID)	Count Site	Count Date	Count	Start Name	End Name	Notes
BASSETT RD (124)	BASSETT RD 10m	26/11/1990	5240	MIDDLETON RD-HELSTON RD RAB	IRONSIDE RD	nth of Ironside
STEWART DUFF DR (1424)		01/07/1991	11887	BROADWAY-CALABAR RD RAB	MOA POINT RD	
CABLE ST (246)	CABLE ST 370m	05/12/1991	15500	TORY ST	BARNETT ST	
ARO ST (77)	ARO ST 150m	04/11/1992	11830	OHIRO RD	BOSTON TCE	46 Aro St at Boston Tce
CALABAR RD (9914)	CALABAR RD 95m	01/07/1994	17200	BROADWAY-CALABAR RD RAB	KEDAH ST	South Kedah
FRIEND ST (566)	FRIEND ST 595m	01/09/1994	9600	RAINE ST	PARKVALE RD	672-44 Friend St, north reading
SUSSEX ST (1449)	SUSSEX ST 50m	29/03/1995	24600	RUGBY ST	BUCKLE ST	415-42 Sussex St, Basin Reserve sth Grand Stand
KARORI RD (798)	KARORI RD 615m	01/04/1995	17000	HATTON ST	FANCOURT ST	sth of Hatton St
RUGBY ST (1332)	RUGBY ST 190m	02/05/1995	17700	BELFAST ST	SUSSEX ST	Rugby west bound at Adelaide Rd
COBHAM DR SOUTH (9951)	COBHAM DR SOUTH 440m	15/07/1995	31000	TROY ST-COBHAM DR RAB	TROY ST-COBHAM DR RAB	east of Evans Bay Pde
MIRAMAR AVE (1015)	MIRAMAR AVE 156m	01/04/1996	20000	MAUPUIA RD	MIRAMAR RD TAUHINU RD RAB	west of Maupia Rd
QUEENS DR (1237)	QUEENS DR 1600m	01/05/1996	5600	SUTHERLAND RD	QUEENS DR-#266 LOOP	Queens Dr sth Sutherland Rd
BROADWAY (201)	BROADWAY 130m	11/05/1996	11000	KAURI ST	HOBART ST	east of Kauri
CAMBRIDGE TCE (261)	CAMBRIDGE TCE 309m	01/06/1996	12423	VIVIAN ST	COLLEGE ST	Buckle and Ellice Junction
CAMBRIDGE TCE (261)	CAMBRIDGE TCE 534m	01/06/1996	20993	ELIZABETH ST	ALPHA ST	
DIXON ST (435)	DIXON ST 50m	01/06/1996	6539	TARANAKI ST	EGMONT ST	
GHUZNEE ST (579)	GHUZNEE ST 132m	01/06/1996	21118	BULLER ST	GHUZNEE ST-SL	
BOULCOTT ST (179)	BOULCOTT ST 540m	01/06/1996	6675	OVERBRIDGE 1ST ABUT	OVERBRIDGE 2ND ABUT	
MT VICTORIA TUNNEL (9977)	MT VICTORIA TUNNEL 20m	01/10/2001	19233	PATERSON ST	TAURIMA ST	
VIVIAN ST (1594)	VIVIAN ST 838m	01/10/2001	23289	WALTER ST	VICTORIA ST	
VIVIAN ST (1594)	VIVIAN ST 654m	01/10/2001	23291	DUNLOP TCE	CUBA ST	
VIVIAN ST (1594)	VIVIAN ST 264m	01/10/2001	16065	TORY ST	TARANAKI ST	
MULGRAVE ST (1057)	MULGRAVE ST 270m	18/04/2005	9288	KATE SHEPPARD PL	THORNDON QUAY	
KARORI RD (798)	KARORI RD 1300m	01/07/2005	13752	BEAUCHAMP ST	CHAMBERLAIN RD	
MAIN RD (1973)		27/07/2005	13561	OXFORD ST	ELENA PL	
MAIN RD (1973)		05/08/2005	11561	MCLELLAN ST	FYVIE AVE	
KARORI RD (798)	KARORI RD 1020m	01/10/2005	16820	READING ST	CAMPBELL ST	
HELSTON RD (679)	HELSTON RD 50m	13/10/2005	13502	WEST BRIDGE 1ST ABUT	WEST BRIDGE 2ND ABUT	
THE ESPLANADE (1504)	THE ESPLANADE 10m	27/10/2005	7528	QUEENS DR	HOUGHTON BAY RD	
BURMA RD (231)	BURMA RD 1245m	01/11/2005	11660	RANGOON ST	KIM ST	
CASHMERE AVE (289)	CASHMERE AVE 900m	01/11/2005	5483	RANUI CRES	RAUMATI TCE	
TINAKORI RD (1518)	TINAKORI RD 200m	11/01/2006	8908	COTTLEVILLE TCE	HOBSON ST	
WILTON RD (1669)	WILTON RD 900m	11/02/2006	5140	SHROPSHIRE AVE	GLOUCESTER ST	
LENNEL RD (871)	LENNEL RD 100m	22/02/2006	6845	BARNARD ST	SEFTON ST	
MURPHY ST (1058)	MURPHY ST 100m	22/03/2006	10941	OVERBRIDGE 2ND ABUT	SH 1 OFFRAMP	
LENNEL RD (871)	LENNEL RD 300m	23/03/2006	6081	SEFTON ST	MOORHOUSE ST	
BROADWAY (201)	BROADWAY 780m	20/06/2006	9682	MONORGAN RD	IRA ST-BROADWAY RAB	
CUSTOMHOUSE QUAY-WEST (3300)	CUSTOMHOUSE QUAY-WEST 230m	07/08/2006	22490	BALLANCE ST	WHITMORE ST	
FEATHERSTON ST (522)	FEATHERSTON ST 570m	07/08/2006	9416	WARING TAYLOR ST	JOHNSTON ST	
FEATHERSTON ST (522)	FEATHERSTON ST 640m	07/08/2006	9500	JOHNSTON ST	BRANDON ST	
MANNERS ST (954)	MANNERS ST 212m	07/08/2006	6861	OPERA HOUSE LANE	CUBA ST	
VICTORIA ST (1590)		07/08/2006	12409	MERCER ST	BOND ST	
TARANAKI ST (1477)	TARANAKI ST 990m	07/08/2006	26565	BUCKLE ST	WEBB ST	
COBHAM DR (351)	COBHAM DR 1500m	30/08/2006	19511	CALABAR RD-COBHAM DR RAB	SHELLY BAY RD	
CHURCHILL DR (333)	CHURCHILL DR 1190m	16/09/2006	5851	BLACKBRIDGE RD	WILTON BUSH RD	
COBHAM DR SOUTH (9951)	COBHAM DR SOUTH 200m	16/09/2006	19225	CALABAR RD-COBHAM DR RAB	TROY ST-COBHAM DR RAB	
HELSTON RD (679)	HELSTON RD 130m	16/09/2006	13167	EAST BRIDGE 1ST ABUT	EAST BRIDGE 2ND ABUT	
HOROKIWI RD WEST (725)	HOROKIWI RD WEST 310m	16/06/2007	5146	PINKERTON GR	KINAPORI TCE	
HALSWATER DR (637)	HALSWATER DR 200m	16/06/2007	7248	DORMAR PL	BURBANK CRES	
UPLAND RD (1571)	UPLAND RD 570m	15/08/2007	11095	GROVE RD	ST MICHAELS CRES	
MOOREFIELD RD (1039)	MOOREFIELD RD 39m	15/08/2007	23423	MIDDLETON RD-HELSTON RD RAB	MOOREFIELD RD-JOHNSONVILLE RD RAB	
UPLAND RD (1571)	UPLAND RD 960m	15/09/2007	10324	KOWHAI RD	BOUNDARY RD	
ARO ST (77)	ARO ST 430m	15/09/2007	8355	EPUNI ST	DURHAM ST	
BROOKLYN RD (208)	BROOKLYN RD 970m	15/09/2007	18882	BIDWILL ST	WASHINGTON AVE	
MOXHAM AVE (1052)	MOXHAM AVE 340m	15/09/2007	5648	TAPIRI ST	RAUPO ST	
KILBIRNIE CRES (820)	KILBIRNIE CRES 280m	15/09/2007	10543	VALLANCE ST	DUNCAN TCE	
ONEPU RD (1133)	ONEPU RD 630m	15/10/2007	7023	ENDEAVOUR ST	RESOLUTION ST	
COUTTS ST (388)	COUTTS ST 575m	15/10/2007	5272	TE WHITI ST	SALEK ST	
TROY ST (1554)	TROY ST 60m	25/10/2007	7661	RONGOTAI RD	KEMP ST	
COBHAM DR (351)	COBHAM DR 400m	02/11/2007	35384	EVANS BAY PDE	TROY ST-COBHAM DR RAB	
COBHAM DR (351)	COBHAM DR 1080m	02/11/2007	45854	TROY ST-COBHAM DR RAB	CALABAR RD-COBHAM DR RAB	
COUTTS ST (388)	COUTTS ST 300m	04/12/2007	6838	MAHORA ST	ROSS ST	
STEWART DR (1423)	STEWART DR 560m	21/05/2008	6228	QUIGLEY ST	FITZPATRICK ST	
NEWLANDS RD (1083)	NEWLANDS RD 570m	21/05/2008	13199	WAKELY RD	SALFORD ST	
NEWLANDS RD (1083)	NEWLANDS RD 1000m	21/05/2008	9835	STELLA GR	WESTLEIGH WAY	
HOROKIWI RD WEST (725)	HOROKIWI RD WEST 206m	22/05/2008	5115	WARRINGTON GR	PINKERTON GR	
MIDDLETON RD (1003)	MIDDLETON RD 1203m	05/06/2008	6546	WINGFIELD PL	HALSWATER DR	
MIDDLETON RD (1003)	MIDDLETON RD 944m	05/06/2008	6752	CHURTON DR	WINGFIELD PL	
HOROKIWI RD WEST (725)	HOROKIWI RD WEST 90m	12/06/2008	5341	KENMORE ST	WARRINGTON GR	
TAKAPU RD (1467)	TAKAPU RD 1018m	14/06/2008	5361	BING LUCAS DR	JAMAICA DR	
BOX HILL (186)	BOX HILL 250m	25/07/2008	11026	WOODMANCOTE RD	CLARK ST	
BURMA RD (231)	BURMA RD 1120m	29/07/2008	13837	MALDIVE ST	RANGOON ST	
MAIN RD (1973)		07/08/2008	13539	REDWOOD AVE-#28 MAIN RD	REDWOOD AVE-#80 MAIN RD	
NGAIO GORGE RD (1087)	NGAIO GORGE RD 30m	15/08/2008	7766	KENYA ST	PERTH ST	
ARO ST (77)	ARO ST 200m	28/08/2008	9920	BOSTON TCE	ALAMEDA TCE	
HUTT RD-CBD (3401)	HUTT RD-CBD 54m	05/09/2008	17917	TINAKORI RD	SAR ST	
RONGOTAI RD-SOUTH (9940)	RONGOTAI RD-SOUTH 550m	14/11/2008	6590	TE WHITI ST	YULE ST	
WEBB ST (1634)	WEBB ST 303m	19/11/2008	7789	CUBA ST	THOMPSON ST	
BROADWAY (201)	BROADWAY 960	21/03/2009	11403	IRA ST-BROADWAY RAB	GLAMIS AVE	
TINAKORI RD (1518)	TINAKORI RD 1260m	25/03/2009	12781	HARRIETT ST	HILL ST	
MIRAMAR AVE (1015)	MIRAMAR AVE 396m	26/03/2009	15437	STONE ST	PARK RD-HOBART ST RAB	
PARK RD-SLIP (3163)	PARK RD-SLIP 30m	26/03/2009	5422	MIRAMAR AVE	PARK RD	
JOHN ST (772)	JOHN ST 132m	02/04/2009	24709	HANSON ST	TASMAN ST	
BROADWAY (201)	BROADWAY 433m	29/04/2009	12309	WAYSIDE WEST	CRAWFORD GREEN	
PARA ST (1173)	PARA ST 540m	30/04/2009	7221	REX ST	ROTHERHAM TCE	
PARA ST (1173)	PARA ST 180m	30/04/2009	6493	ATHENS ST	ASHLEIGH CRES	
VICTORIA ST (1590)	VICTORIA ST 1291m	01/05/2009	11609	KARO DR	WEBB ST	
BROADWAY (201)	BROADWAY 1100m	08/05/2009	8014	WILBERFORCE ST	BENTINCK AVE	
CALABAR RD (9914)	CALABAR RD 448m	08/05/2009	23927	KEDAH ST	CALEDONIA ST	
CALABAR RD (9914)	CALABAR RD 859m	08/05/2009	26804	CALABAR RD-#88 EXT	COBHAM DR-CALABAR RD RAB	
TORY ST (1536)	TORY ST 544m	13/05/2009	7017	JESSIE ST	VIVIAN ST	
WEBB ST (1634)	WEBB ST 133m	17/06/2009	8904	HOPPER ST	TORRENS TCE	
CUSTOMHOUSE QUAY (407)	CUSTOMHOUSE QUAY 207m	19/06/2009	16834	JOHNSTON ST	BRANDON ST	
CUSTOMHOUSE QUAY-WEST (3300)	CUSTOMHOUSE QUAY-WEST 40m	19/06/2009	20297	BRANDON ST	JOHNSTON ST	
GHUZNEE ST (579)	GHUZNEE ST 40m	23/06/2009	11985	THE TERRACE	BULLER ST	
TARANAKI ST (1477)	TARANAKI ST 864m	24/06/2009	22292	MARTIN SQ	MARTIN SQ	
HUNTER ST (736)	HUNTER ST 130m	22/07/2009	11351	CUSTOMHOUSE QUAY	VICTORIA ST	
TORY ST (1536)	TORY ST 314m	12/08/2009	7907	FORRESTERS LANE	HOLLAND ST	
KARORI RD (798)	KARORI RD 1745m	21/08/2009	11831	MORLEY ST	BURROWS AVE	
KARORI RD (798)	KARORI RD 111m	27/08/2009	20012	STANDEN ST	NOTTINGHAM ST	
FEATHERSTON ST (522)	FEATHERSTON ST 417m	28/10/2009	9256	WHITMORE ST	BALLANCE ST	
MOXHAM AVE (1052)	MOXHAM AVE 617m	05/11/2009	5296	GOA ST	KUPE ST	
TINAKORI RD (1518)	TINAKORI RD 580m SCATS (20)	08/02/2010	7700	MURPHY ST	GEORGE ST	SCATS - 2 Detectors StWstApp
MURPHY ST (1058)	MURPHY ST 288m SCATS (25)	08/02/2010	10821	HALSWELL ST	TURNBULL ST	SCATS - 2 DETECTORS NthApp
CUSTOMHOUSE QUAY (407)	CUSTOMHOUSE QUAY 162m SCATS (190)	08/02/2010	19654	WARING TAYLOR ST	JOHNSTON ST	SCATS - 3 DETECTORS - 3 LANES NthEstApp
FEATHERSTON ST (522)	FEATHERSTON ST 706m SCATS (220)	08/02/2010	9170	BRANDON ST	PANAMA ST	SCATS - 2 DETECTORS - ONE WAY NthEstApp
FEATHERSTON ST (522)	FEATHERSTON ST 328m SCATS (130)	08/02/2010	13177	BUNNY ST	WHITMORE ST	SCATS - 4 DETECTORS NthEstApp
RONGOTAI RD (1309)	RONGOTAI RD 256m SCATS 1340	08/02/2010	12505	ONEPU RD	MAHORA ST	SCATS - RONGOTAI RD - 3 DETECTORS, EST APP
COBHAM DR SOUTH (9951)	COBHAM DR SOUTH 1213m SCATS 1310	08/02/2010	21457	TROY ST-COBHAM DR RAB	EVANS BAY PDE	SCATS - (STATE HGWY) COBHAM DR SOUTH - 2 DETECTORS, EST APP
WELLINGTON RD SOUTH (9921)	WELLINGTON RD SOUTH 152m SCATS 13(	08/02/2010	15587	EVANS BAY PDE	KILBIRNIE CRES	SCATS - WELLINGTON RD (TRANSIT) - 3 DTORS, 2 LANES, EST APP
WELLINGTON RD (1640)	WELLINGTON RD 430m SCATS 1300	08/02/2010	17786	WALMER ST	HAMILTON RD	SCATS - 3 DETECTORS, 1 LANE, WST APP
WELLINGTON RD (1640)	WELLINGTON RD 485m SCATS 1300	08/02/2010	15587	HAMILTON RD	EVANS BAY PDE	SCATS - 3 DETECTORS, 2 LANES, EST APP
CHAYTOR ST (308)	CHAYTOR ST 29m SCATS 1220	08/02/2010	8710	WAIAPU RD	BIRDWOOD ST	SCATS - 2 DETECTORS, 2 LANES, STH APP
KARORI RD (798)	KARORI RD 17m SCATS 1210	08/02/2010	9825	OLD KARORI RD	STANDEN ST	SCATS- KARORI RD - 2 DETECTORS, 2 LANES, STH WST APP
KARORI RD (798)	KARORI RD 826m SCATS 1190	08/02/2010	8611	FANCOURT ST	DONALD ST	SCATS - 1 DETECTOR, 1 LANE, NTH EST APP
KAIWHARAWHARA RD (788)	KAIWHARAWHARA RD 8m SCATS 1110	08/02/2010	6584	HUTT RD	PICKERING ST	SCATS - 2 DETECTORS, 2 LANES, NTH WST APP
HUTT RD-CBD (3401)	HUTT RD-CBD 1072m SCATS 1110	08/02/2010	14009	SCHOOL RD	KAIWHARAWHARA RD	SCATS - HUTT RD - 3 DETECTORS, 3 LANES, STH WST APP
JOHNSONVILLE RD (774)	JOHNSONVILLE RD 385m SCATS 1015	08/02/2010	8815	HAWEA ST	BILL CUTTING PL	SCATS - 1 DETECTOR, 1 LANE, STH APP
CONSTABLE ST (371)	CONSTABLE ST 563m SCATS 0755	08/02/2010	8537	HIROPI ST	COROMANDEL ST	SCATS - 2 LANES, 2 DETECTORS, WST APP
CONSTABLE ST (371)	CONSTABLE ST 405m SCATS 0750	08/02/2010	8447	OWEN ST	HIROPI ST	SCATS - 1 DETECTOR, 1 LANE, EST APP
RIDDIFORD ST (1294)	RIDDIFORD ST 757m SCATS 0740	08/02/2010	6489	CONSTABLE ST	NEWTOWN AVE	SCATS - 2 LANES, 2 DETECTORS, STH APP
RIDDIFORD ST (1294)	RIDDIFORD ST 547m SCATS 0730	08/02/2010	8949	EMMETT ST	GREEN ST	SCATS - 2 LANES, 2 DETECTORS, STH APP
RIDDIFORD ST (1294)	RIDDIFORD ST 397m SCATS 0720	08/02/2010	11332	REGINA TCE	MEIN ST	SCATS - 3 DETECTORS, 3 LANES, NTH APP
JOHN ST (772)	JOHN ST 10m SCATS 0700	08/02/2010	9710	ADELAIDE RD	HANSON ST	SCATS - JOHN ST - 2 LANES, 2 DETECTORS, WST APP
ADELAIDE RD (12)	ADELAIDE RD 567m SCATS 0695	08/02/2010	8176	DRUMMOND ST	HOSPITAL RD	SCATS - 2 LANES, 2 DETECTORS, NTH EST APP
ADELAIDE RD (12)	ADELAIDE RD 407m SCATS 0690	08/02/2010	8996	BROOMHEDGE ST	DRUMMOND ST	SCATS - 2 LANES, 2 DETECTORS, NTH APP
ADELAIDE RD (12)	ADELAIDE RD 5m SCATS 0650	08/02/2010	11520	RUGBY ST	ALFRED ST	SCATS - 2 LANES, 2 DETECTORS, STH EST APP
RUGBY ST (1332)	RUGBY ST 97m SCATS 0650	08/02/2010	21906	DUFFERIN ST	ADELAIDE RD	SCATS - 3 LANES, 3 DETECTORS, EST APP
DUFFERIN ST (458)	DUFFERIN ST 76m SCATS 0645	08/02/2010	29758	ELLICE ST	PATERSON ST	SCATS - (1 WAY) - 4 DETECTORS, 4 LANES, NTH EST APP
PATERSON ST (1180)	PATERSON ST 10m SCATS 0645	08/02/2010	19021	DUFFERIN ST	MT VICTORIA TUNNEL	SCATS - 2 DETECTORS -SthEstApp
BUCKLE ST (223)	BUCKLE ST 239m SCATS 0630	08/02/2010	21941	TASMAN ST	SUSSEX ST	SCATS - BUCKLE ST - 2 LANES, 2 DETECTORS, STH EST APP
BUCKLE ST (223)	BUCKLE ST 18m SCATS 0620	08/02/2010	24606	TARANAKI ST	BUCKLE ST-LOOP	SCATS - BUCKLE ST - 4 LANES, 4 DETECTORS, STH EST APP
TARANAKI ST (1477)	TARANAKI ST 1027m SCATS 0620	08/02/2010	7762	WEBB ST	WIDTH CHANGE	SCATS - TARANAKI ST - 2 LANES, 2 DETECTORS, STH WST APP
TARANAKI ST (1477)	TARANAKI ST 930m SCATS 0620	08/02/2010	10822	MARTIN SQ	BUCKLE ST	SCATS - 3 LANES, 3 DETECTORS, NTH EST APP
ARTHUR ST (79)	ARTHUR ST 190m SCATS 0615	08/02/2010	25496	TARANAKI ST	CUBA ST	SCATS - ARTHUR ST(1 WAY) - 2 LANES, 2 DETECTORS, STH EST APP
VICTORIA ST (1590)	VICTORIA ST 1241m SCATS 0610	08/02/2010	12594	ABEL SMITH ST	KARO DR	SCATS - VICTORIA ST(1 WAY) - 3 LANES, 4 DTORS, NTH EST APP
KARO DR (2204)	KARO DR 181m SCATS 0610	08/02/2010	23270	CUBA ST	VICTORIA ST	SCATS - KARO DR(1 WAY)-4 LNS,3 DTORS(EX L TURN), STHEST APP
KARO DR (2204)	KARO DR 272m SCATS 0605	08/02/2010	51579	VICTORIA ST	WILLIS ST	SCATS - (1 WAY) - 3 LANES, 3 DETECTORS, STH EST APP
WILLIS ST (1666)	WILLIS ST 1087m SCATS 0605	08/02/2010	18342	ABEL SMITH ST	PALMER ST	SCATS - WILLIS ST(1 WAY) - 3 LANES, 3 DETECTORS, STH WST APP
WILLIS ST (1666)	WILLIS ST 1264m SCATS 0600	08/02/2010	5634	WEBB ST	NAIRN ST	SCATS - WILLIS ST - 2 LANES, 2 DETECTORS, STH WST APP
WEBB ST (1634)	WEBB ST 458m SCATS 0600	08/02/2010	12337	VICTORIA ST	WILLIS ST	SCATS - (1 WAY) - 3 LANES, 3 DETECTORS, STH EST APP
VIVIAN ST (1594)	VIVIAN ST 36m SCATS 0570	08/02/2010	6047	KENT TCE	TORY ST	SCATS - (1 WAY) - 2 LANES, 2 DETECTORS, NTH WST APP
CAMBRIDGE TCE (261)	CAMBRIDGE TCE 284m SCATS 0570	08/02/2010	10190	FIFESHIRE AVE	VIVIAN ST	SCATS - (1 WAY) - 4 LANES, 4 DETECTORS, STH WST APP
TARANAKI ST (1477)	TARANAKI ST 637m SCATS 0550	08/02/2010	10127	JESSIE ST	VIVIAN ST	SCATS - 3 LANES, 3 DETECTORS, NTH EST APP
VIVIAN ST (1594)	VIVIAN ST 478m SCATS 0550	08/02/2010	21749	TARANAKI ST	KNIGGES AVE	SCATS (1 WAY) - 3 LANES, 3 DETECTORS, NTH WST APP
VIVIAN ST (1594)	VIVIAN ST 690m SCATS 0540	08/02/2010	55483	CUBA ST	BUTE ST	SCATS - 3 LANES, 3 DETECTORS, NTH WST APP
VIVIAN ST (1594)	VIVIAN ST 872m SCATS 0530	08/02/2010	24993	VICTORIA ST	WILLIS ST	SCATS - (1 WAY) - 4 LANES, 4 DETECTORS, NTH WAST APP
WILLIS ST (1666)	WILLIS ST 915m SCATS 0520	08/02/2010	9742	VIVIAN ST	ABEL SMITH ST	SCATS- 1 WAY-3 DET, STHWSTAPP (MWY OFF RMP DET 1+2+3 = 21042
TARANAKI ST (1477)	TARANAKI ST 495m SCATS 0510	08/02/2010	7522	GHUZNEE ST	JESSIE ST	SCATS - 2 LANES, 2 DETECTORS, STH WST APP
TARANAKI ST (1477)	TARANAKI ST 460m SCATS 0510	08/02/2010	7554	INGLEWOOD PL	GHUZNEE ST	SCATS - 3 LANES, 3 DETECTORS, NTH EST APP
GHUZNEE ST (579)	GHUZNEE ST 191m SCATS 0480	08/02/2010	7556	GHUZNEE ST-SL	WILLIS ST	SCATS - GHUZNEE ST - 2 LANES, 2 DETECTORS, NTH WST APP
CAMBRIDGE TCE (261)	CAMBRIDGE TCE 456m SCATS 0475	08/02/2010	12832	LORNE ST	ELIZABETH ST	SCATS (1 WAY) - 4 LANES, 4 DETECTORS, STH WST APP
TARANAKI ST (1477)	TARANAKI ST 313m SCATS 0450	08/02/2010	11081	MANNERS ST	INGLEWOOD PL	SCATS - 4 LANES, 4 DETECTORS, STH WST APP
CUBA ST (401)	CUBA ST 126m SCATS 0420	08/02/2010	8061	MALL NARROWS	MANNERS ST	SCATS - CUBA ST(1 WAY) - 2 LANES, 2 DETECTORS, NTH EST APP
VICTORIA ST (1590)	VICTORIA ST 524m SCATS 0410	08/02/2010	8932	BOND ST	MANNERS ST	SCATS (1 WAY) - 2 LANES, 2 DETECTORS, NTH EST APP
WILLIS ST (1666)	WILLIS ST 350m SCATS 0400	08/02/2010	7005	BOULCOTT ST	FLAGSTAFF LANE	SCATS - 2 LANES, 2 DETECTORS, STH WST APP
CABLE ST (246)	CABLE ST 459m SCATS 0386	08/02/2010	20358	BARNETT ST	CHAFFERS ST	SCATS - (1 WAY) - 3 LANES, 3 DETECTORS, NTH WST APP
TARANAKI ST (1477)	TARANAKI ST 144m SCATS 0380	08/02/2010	7723	WAKEFIELD ST	LUKES LANE	SCATS - TARANAKI ST - 4 LANES, 4 DETECTORS, STH WST APP
TARANAKI ST (1477)	TARANAKI ST 124m SCATS 0380	08/02/2010	5303	CABLE ST	WAKEFIELD ST	SCATS - TARANAKI ST - 3 LANES, 3 DETECTORS, NTH EST APP

WILLIS ST (1666)	WILLIS ST 227m SCATS 0350	08/02/2010	9129	MERCER ST	BOND ST	SCATS - (1 WAY) - 2 LANES, 2 DETECTORS, STH WST APP
WILLIS ST (1666)	WILLIS ST 11m SCATS 0320	08/02/2010	6143	WILLESTON ST	MERCER ST	SCATS - WILLIS ST - 2 LANES, 2 DETECTORS, STH WST APP
HUNTER ST (736)	HUNTER ST 82m SCATS 0310	08/02/2010	10233	LAMBTON QUAY	CUSTOMHOUSE QUAY	SCATS (1 WAY) - 3 LANES, 2 DETECTORS, NTH WST APP
FEATHERSTON ST (522)	FEATHERSTON ST 867m SCATS 0290	08/02/2010	10143	GREY ST	HUNTER ST	SCATS- (1 WAY) - 2 LANES, 2 DETECTORS, NTH EST APP
FEATHERSTON ST (522)	FEATHERSTON ST 772m SCATS 0285	08/02/2010	9707	PANAMA ST	GREY ST	SCATS - (1 WAY) - 2 LANES, 2 DETECTORS, NTH EST APP
THE TERRACE (1510)	THE TERRACE 755m SCATS 0270	08/02/2010	7426	THE TERRACE-SLIP	EVERTON TCE	SCATS - 2 LANES, 2 DETECTORS, NTH EST APP
JERVOIS QUAY-WEST (3257)	JERVOIS QUAY-WEST 705m SCATS 0240	08/02/2010	21712	HUNTER ST	POST OFFICE SQ	SCATS, 3 DETECTORS, STH APP(1 DET @Q WHARF)
DANIELL ST (411)	DANIELL ST 410m	09/02/2010	5241	NEWTOWN AVE	NORMANBY ST	
WALLACE ST (1615)	WALLACE ST 46m SCATS 0680	15/02/2010	15800	BIDWILL ST	ROLLESTON ST	SCATS - 2 LANES, 2 DETECTORS, STH APP(1 DET @ POLYTECH)
WALLACE ST (1615)	WALLACE ST 23m SCATS 0680	15/02/2010	11645	HANKEY ST	BIDWILL ST	SCATS - 2 LANES, 2 DETECTORS, NTH APP(1 DET @ POLYTECH)
DIXON ST (435)	DIXON ST 188m SCATS 0440	15/02/2010	7043	EVA ST	CUBA ST	SCATS - DIXON ST - 2 LANES, 2 DETECTORS, STH EST APP
VICTORIA ST (1590)	VICTORIA ST 623m SCATS 0430	15/02/2010	7852	MANNERS ST	DIXON ST	SCATS - 3 LANES, 3 DETECTORS, NTH EST APP
JERVOIS QUAY-WEST (3257)	JERVOIS QUAY-WEST 599m SCATS 0315	15/02/2010	21928	WILLESTON ST	HUNTER ST	SCATS -4 LANES,4 DETECTORS,STH APP(2 DET @EVENT CEN)
JERVOIS QUAY (768)	JERVOIS QUAY 216m SCATS 0315	15/02/2010	20457	QUEENS WHARF	HUNTER ST	SCATS - 3 LANES,3 DTORS, NTH APP(2 DET @ EVENT CEN)
MAJORIBANKS ST (932)	MAJORIBANKS ST 40m	20/02/2010	7226	KENT TCE	ROXBURGH ST	
WELLINGTON RD (1640)	WELLINGTON RD 95m	12/03/2010	9132	HENRY ST	RUAHINE ST	
LYALL PDE (912)	LYALL PDE 1167m	12/03/2010	7467	RUA ST	QUEENS DR-LYALL PDE RAB	
PARK RD (1174)	PARK RD 176m	17/03/2010	6062	TAHI ST	BYRON ST	
LYALL PDE (912)	LYALL PDE 389m	20/03/2010	6892	LYALL PDE-TIRANGI RD RAB	KINGSFORD SMITH ST	
LYALL PDE (912)	LYALL PDE 271m	20/03/2010	6168	COCHRANE ST	LYALL PDE-TIRANGI RD RAB	
OHIRO RD (1122)	OHIRO RD 1011m	04/05/2010	13286	BROOKLYN RD	TANERA CRES	
EVANS BAY PDE (509)	EVANS BAY PDE 4110m	04/05/2010	5832	KEMP ST	KILBIRNIE CRES	
ADELAIDE RD (12)	ADELAIDE RD 1388m	08/05/2010	10687	COLOMBO ST	STOKE ST	
ADELAIDE RD (12)	ADELAIDE RD 2316m	08/05/2010	12446	BRITOMART ST	CHILKA ST	
THE PARADE (1505)	THE PARADE 970m	08/05/2010	7678	MEDWAY ST	MERSEY ST	
COUTTS ST (388)	COUTTS ST 232m	13/05/2010	5545	ONEPU RD	MAHORA ST	
KAIWHARAWHARA RD (788)	KAIWHARAWHARA RD 576m	26/06/2010	10979	OLD PORIRUA RD	NGAIO GORGE RD	
WILLIS ST (1666)	WILLIS ST 1160m	30/06/2010	10413	PALMER ST	ARO ST	
ADELAIDE RD (12)	ADELAIDE RD 1720m	01/07/2010	9518	TORQUAY TCE	WARIPORI ST	
TINAKORI RD (1518)	TINAKORI RD 1474m	17/07/2010	11795	UPTON TCE	ASCOT ST	
HUTT RD (3402)	HUTT RD 2040m	20/07/2010	17956	RANGIORA AVE	ONSLOW RD	
HUTT RD-SOUTH (3100)	HUTT RD-SOUTH 200m	20/07/2010	7731	JARDEN MILE	ONSLOW RD	
HUTT RD-CBD (3401)	HUTT RD-CBD 395m	23/07/2010	17849	SAR ST	AOTEA QUAY-SOUTH-END ISL RHS	
HUTT RD (3402)	HUTT RD 1160m	23/07/2010	18788	KAIWHARAWHARA RD	WESTMINSTER ST	
THE PARADE (1505)	THE PARADE 209m	23/07/2010	10510	DEE ST	TAMAR ST	
CABLE ST (246)	CABLE ST 320m	28/07/2010	17110	TARANAKI ST	TORY ST	
STEWART DR (1423)	STEWART DR 196m	31/07/2010	5604	BATCHELOR ST	PRITCHARD ST	
ORIENTAL PDE (1147)	ORIENTAL PDE 64m	03/08/2010	16352	KENT TCE	CABLE ST	
WILLIS ST (1666)	WILLIS ST 1221m	04/08/2010	11410	ARO ST	WEBB ST	
TARANAKI ST (1477)	TARANAKI ST 695m	11/08/2010	18912	VIVIAN ST	FREDERICK ST	
GHUZNEE ST (579)	GHUZNEE ST 610m	11/08/2010	12856	MARION ST	TARANAKI ST	
JERVOIS QUAY (768)	JERVOIS QUAY 262m	11/08/2010	17212	HUNTER ST	WILLESTON ST	
LAMBTON QUAY (857)	LAMBTON QUAY 420m	12/08/2010	5384	BRANDON ST	JOHNSTON ST	
MIDDLETON RD (1003)	MIDDLETON RD 672m	19/08/2010	7476	BURDENDALE GR	SILVERBIRCH GR	
GHUZNEE ST (579)	GHUZNEE ST 267m	19/08/2010	13464	WILLIS ST	VICTORIA ST	
WAKEFIELD ST (1611)	WAKEFIELD ST 225m	21/08/2010	15042	ALLEN ST	TORY ST	
JERVOIS QUAY (768)	JERVOIS QUAY 570m	21/08/2010	17059	HARRIS ST	CABLE ST	
THE TERRACE (1510)	THE TERRACE 60m	02/09/2010	8996	BOWEN ST	BOLTON ST	
MOOREFIELD RD (1039)	MOOREFIELD RD 246m	07/09/2010	13434	FRANKMOORE AVE	WANAKA ST	
HELSTON RD (679)	HELSTON RD 179m	07/09/2010	12226	EAST BRIDGE 2ND ABUT	PETHERICK CRES	
WHITMORE ST (1656)	WHITMORE ST 237m	08/09/2010	11428	FEATHERSTON ST	CUSTOMHOUSE QUAY	
LAMBTON QUAY (857)	LAMBTON QUAY 554m	08/09/2010	5091	WARING TAYLOR ST	STOUT ST	
AOTEA QUAY (53)	AOTEA QUAY 434m	13/09/2010	29207	WATERLOO QUAY	END OF SH1 OFFRAMP	
BRODERICK RD (204)	BRODERICK RD 183m	17/09/2010	9591	GOTHIC ST	BOULD ST	
VICTORIA ST (1590)	VICTORIA ST 159m	21/09/2010	9702	WILLESTON ST	HARRIS ST	
TARANAKI ST (1477)	TARANAKI ST 244m	13/10/2010	14912	LUKES LANE	MANNERS ST	
LINDEN AVE (2024)	LINDEN AVE 50m	14/10/2010	7108	MAIN RD	FINDLAY ST	
COLLINS AVE (1994)	COLLINS AVE 116m	16/10/2010	6494	RAILWAY CROSSING	HINAU ST	
NEWLANDS RD (1083)	NEWLANDS RD 785m	09/11/2010	9614	BLACK ROCK RD	STELLA GR	
WESTCHESTER DR EAST (1896)	WESTCHESTER DR EAST 328m	10/11/2010	5615	MIDDLETON RD	OVERBRIDGE 1ST ABUT	
MAIN RD (1973)	MAIN RD 2877m	10/11/2010	14941	VICTORY CRES	MCLELLAN ST	
MAIN RD (1973)	MAIN RD 3811m	10/11/2010	16781	LINDEN AVE	THOMAS HOOK ST	
MAIN RD (1973)	MAIN RD 4152m	10/11/2010	17283	WALL PL	REMBRANDT AVE	
MIDDLETON RD (1003)	MIDDLETON RD 1694m	16/11/2010	8171	HALSWATER DR	GLENSIDE RD	
THE TERRACE (1510)	THE TERRACE 1272m	20/11/2010	16619	SALAMANCA RD	DIXON ST	
BURMA RD (231)	BURMA RD 1520m	03/12/2010	14649	KIM ST	KOHIMA DR	
KHANDALLAH RD (817)	KHANDALLAH RD 245m	08/02/2011	10776	COCKAYNE RD	LUCKNOW TCE	
KHANDALLAH RD (817)	KHANDALLAH RD 668m	08/02/2011	11655	NGATOTO ST	TARIKAKA ST	
COCKAYNE RD (353)	COCKAYNE RD 1740m	08/02/2011	11457	KHANDALLAH RD	COCKAYNE RD-BOX HILL RAB	
ONSLOW RD (1134)	ONSLOW RD 1020m	10/02/2011	5638	HOMEBUSH RD	LOHIA ST	
GRANT RD (614)	GRANT RD 114m	11/02/2011	6699	GOLDIES BRAE	GRANT RD-SLIP	
MONORGAN RD (1031)	MONORGAN RD 90m	18/02/2011	5119	BROADWAY	RAUKAWA ST	
BROADWAY (201)	BROADWAY 652m	23/02/2011	12574	CRAWFORD GREEN	MONORGAN RD	
PARA ST (1173)	PARA ST 50m	22/03/2011	6048	MIRAMAR AVE	ATHENS ST	
PARA ST (1173)	PARA ST 450m	22/03/2011	5965	ASHLEIGH CRES	REX ST	
BROADWAY (201)	BROADWAY 1500m	24/03/2011	5957	CAVENDISH SQ	SEATOUN TUNNEL	
BROADWAY (201)	BROADWAY 926m	25/03/2011	11130	IRA ST-BROADWAY RAB	IRA ST-BROADWAY RAB	
MIRAMAR AVE (1015)	MIRAMAR AVE 587m	25/03/2011	8792	PARK RD-HOBART ST RAB	CHELSEA ST	
PARK RD (1174)	PARK RD 96m	25/03/2011	7906	PARK RD-SLIP	TAHI ST	
MIRAMAR AVE (1015)	MIRAMAR AVE 191m	05/04/2011	20013	MIRAMAR RD TAUHINU RD RAB	STONE ST	
LYALL PDE (912)	LYALL PDE 87m	05/04/2011	5763	MOA POINT RD	COCHRANE ST	
CONSTABLE ST (371)	CONSTABLE ST 645m	03/05/2011	18044	COROMANDEL ST	ALEXANDRA RD	
QUEENS DR (1237)	QUEENS DR 274m	03/05/2011	5283	ENDEAVOUR ST	FREYBERG ST	
OHIRO RD (1122)	OHIRO RD 1849	05/05/2011	6078	BUTT ST	BORLASE ST	
THE ESPLANADE (1504)	THE ESPLANADE 1086m	20/05/2011	5813	HOUGHTON BAY RD	BRIGHTON ST	
THE PARADE (1505)	THE PARADE 50m	20/05/2011	11352	DOVER ST	DEE ST	
THE PARADE (1505)	THE PARADE 1352m	20/05/2011	5881	MERSEY ST	HUMBER ST	
ONEPU RD (1133)	ONEPU RD 709m	20/05/2011	6904	RESOLUTION ST	WHA ST	
ONEPU RD (1133)	ONEPU RD 993m	20/05/2011	5712	APU CRES	APU CRES	
HAPPY VALLEY RD (645)	HAPPY VALLEY RD 1607m	08/06/2011	5433	LANDFILL RD	OHIRO RD	
BROOKLYN RD (208)	BROOKLYN RD 160m	09/06/2011	10884	WILLIS ST	NAIRN ST	
OHIRO RD (1122)	OHIRO RD 2134m	09/06/2011	5843	BORLASE ST	HAPPY VALLEY RD	
KILBIRNIE CRES (820)	KILBIRNIE CRES 466m	21/06/2011	9373	TULLY ST	CHILDERS TCE	
RONGOTAI RD (1309)	RONGOTAI RD 69m	21/06/2011	8388	CRAWFORD RD	BAY RD	
RONGOTAI RD (1309)	RONGOTAI RD 180m	21/06/2011	8877	BAY RD	ONEPU RD	
TROY ST (1554)	TROY ST 136m	24/06/2011	7068	KEMP ST	COBHAM DR-TROY ST RAB	
CRAWFORD RD (392)	CRAWFORD RD 740m	02/07/2011	12794	NAUGHTON TCE	RONGOTAI RD	
ADELAIDE RD (12)	ADELAIDE RD 2067m	06/07/2011	9720	WARIPORI ST	PALM GR	
RINTOUL ST (1297)	RINTOUL ST 872m	06/07/2011	7674	WARIPORI ST	LUXFORD ST	
RIDDIFORD ST (1294)	RIDDIFORD ST 467m	07/07/2011	19102	MEIN ST	EMMETT ST	
WELLINGTON RD (1640)	WELLINGTON RD 25m	07/07/2011	10260	CRAWFORD RD-WELLINGTON RD RAB	HENRY ST	
BOWEN ST (184)		22/07/2011	8563	BALLANTRAE PL	SYDNEY ST WEST	
CAMBRIDGE TCE (261)	CAMBRIDGE TCE 326m	22/07/2011	10607	COLLEGE ST	LORNE ST	
THE TERRACE (1510)	THE TERRACE 574m	23/07/2011	9665	DALMUIR LANE	SH 1 OFFRAMP	
WEBB ST (1634)	WEBB ST 343m	03/08/2011	7074	THOMPSON ST	VICTORIA ST	
RIDDIFORD ST (1294)	RIDDIFORD ST 694m	03/08/2011	18689	WILSON ST	CONSTABLE ST	
WEBB ST (1634)	WEBB ST 50m	04/08/2011	7124	TARANAKI ST	HOPPER ST	
ADELAIDE RD (12)	ADELAIDE RD 1200m	04/08/2011	11004	HALL ST	COLOMBO ST	
ADELAIDE RD (12)		04/08/2011	12358	CHILKA ST	AKATEA ST	
RIDDIFORD ST (1294)	RIDDIFORD ST 830m	04/08/2011	12903	NEWTOWN AVE	NORMANBY ST	
ADELAIDE RD (12)	ADELAIDE RD 1559m	05/08/2011	10340	MUDGES TCE	TORQUAY TCE	
PARK RD (1174)	PARK RD 470m	10/08/2011	5985	BRUSSELS ST	REX ST	
PARK RD (1174)	PARK RD 671m	10/08/2011	6093	ROTHERHAM TCE	PURIRI ST	
GLENMORE ST (595)	GLENMORE ST 1656m	11/08/2011	16257	NORTHLAND RD	KARORI TUNNEL	
CHAYTOR ST (308)	CHAYTOR ST 80m	11/08/2011	11749	BIRDWOOD ST	RAROA CRES	
TORY ST (1536)	TORY ST 820m	13/08/2011	6703	FRANCIS PL	BUCKLE ST	
IRA ST (752)	IRA ST 179m	18/08/2011	5903	THE QUADRANT	OTAKI ST	
MOLESWORTH ST (1025)	MOLESWORTH ST 141m	24/08/2011	7187	KATE SHEPPARD PL	HILL ST	
WAKEFIELD ST (1611)	WAKEFIELD ST 79m	26/08/2011	16105	CAMBRIDGE TCE	CHAFFERS ST	
ORIENTAL PDE (1147)	ORIENTAL PDE 165m	26/08/2011	18682	CABLE ST	HERD ST	
CABLE ST (246)		26/08/2011	19218	CHAFFERS ST	ORIENTAL PDE	
CHAFFERS ST (299)	CHAFFERS ST 40m	26/08/2011	6847	WAKEFIELD ST	CABLE ST	
GHUZNEE ST (579)	GHUZNEE ST 397m	31/08/2011	13790	VICTORIA ST	CUBA ST	
MURPHY ST (1058)	MURPHY ST 202	01/09/2011	9395	SH 1 OFFRAMP	HALSWELL ST	
THORNDON QUAY (1514)		01/09/2011	10549	MULGRAVE ST	MOORE ST	
THORNDON QUAY (1514)	THORNDON QUAY 850m	01/09/2011	9430	DAVIS ST	TINAKORI RD	
ADELAIDE RD (12)	ADELAIDE RD 325m	06/09/2011	20568	KING ST	BROOMHEDGE ST	
JOHN ST (772)	JOHN ST 223m	06/09/2011	18818	TASMAN ST	WALLACE ST	
KARORI RD (798)	KARORI RD 518m	22/09/2011	18102	LANCASTER ST	HATTON ST	
KARORI RD (798)	KARORI RD 871m	23/09/2011	16470	DONALD ST	READING ST	
MOXHAM AVE (1052)		27/09/2011	5718	TAURIMA ST	TAPIRI ST	
MOXHAM AVE (1052)	MOXHAM AVE 460m	27/09/2011	5609	RAUPO ST	GOA ST	
TAURIMA ST (1484)	TAURIMA ST 200m	27/09/2011	5627	RUAHINE ST	MOXHAM AVE	
HAMILTON RD (640)	HAMILTON RD 826m	28/10/2011	5860	KUPE ST	WELLINGTON RD	
ORIENTAL PDE (1147)		28/10/2011	16187	ORIENTAL PDE-#186	ORIENTAL PDE-LOOP	
ORIENTAL PDE (1147)	ORIENTAL PDE 1174m	28/10/2011	14130	GRASS ST	CARLTON GORE RD	
DIXON ST (435)		01/11/2011	6225	EGMONT ST	EVA ST	
DIXON ST (435)		01/11/2011	6736	VICTORIA ST	WILLIS ST	
VICTORIA ST (1590)	VICTORIA ST 780m	01/11/2011	9642	VICTORIA ST-#175 SLIP	GHUZNEE ST	
VICTORIA ST (1590)	VICTORIA ST 1073m	01/11/2011	12001	VIVIAN ST	ABEL SMITH ST	
WHITMORE ST (1656)		02/11/2011	13516	LAMBTON QUAY-EAST	STOUT ST	
MOLESWORTH ST (1025)	MOLESWORTH ST 394m	02/11/2011	9520	PIPITEA ST	HAWKESTONE ST	
KARORI RD (798)	KARORI RD 1541m	03/11/2011	12541	EAGLE ST	MORLEY ST	
TORY ST (1536)		09/11/2011	8324	VIVIAN ST	FREDERICK ST	
VICTORIA ST (1590)	VICTORIA ST 933m	09/11/2011	10525	VICTORIA ST-#195 SLIP	VIVIAN ST	
CAMBRIDGE TCE (261)		09/11/2011	10286	COURTENAY PL	WAKEFIELD ST	
MOXHAM AVE (1052)		10/11/2011	8203	WAITOA RD	TAURIMA ST	
KARORI RD (798)	KARORI RD 213m	11/11/2011	19500	NOTTINGHAM ST	FLERS ST	
KARORI RD (798)		11/11/2011	7754	TRINGHAM ST	SOUTH KARORI RD	
GHUZNEE ST (579)	GHUZNEE ST 495m	18/11/2011	14129	CUBA ST	MARION ST	
EVANS BAY PDE (509)	EVANS BAY PDE 2695m	18/11/2011	12443	RATA RD	BELVEDERE RD	
EVANS BAY PDE (509)	EVANS BAY PDE 3052m	18/11/2011	12206	BELVEDERE RD	WELLINGTON RD	
DIXON ST (435)	DIXON ST 227m	18/11/2011	5974	CUBA ST	VICTORIA ST	
KARORI RD (798)	KARORI RD 1186m	23/11/2011	14954	CAMPBELL ST	PARKVALE RD	
KARORI RD (798)	KARORI RD 1246m	23/11/2011	15243	PARKVALE RD	BEAUCHAMP ST	
CURTIS ST (406)		30/11/2011	6853	WHITEHEAD RD	RANDWICK RD	
LAMBTON QUAY (857)	LAMBTON QUAY 882m	01/12/2011	9610	BOWEN ST	BUNNY ST	
CAMBRIDGE TCE (261)		06/12/2011	12822	ALPHA ST	COURTENAY PL	
KENT TCE (813)		06/12/2011	12079	COURTENAY PL	ELIZABETH ST	
WATERLOO QUAY-EAST (3301)	WATERLOO QUAY-EAST 133m	06/12/2011	16609	BUNNY ST	WHITMORE ST	
COURTENAY PL (386)		06/12/2011	5099	ALLEN ST	TORY ST	

CABLE ST (246)		09/12/2011	20488	JERVOIS QUAY-EAST	TARANAKI ST	
CAMBRIDGE TCE (261)	CAMBRIDGE TCE 186m	09/12/2011	11173	BARKER ST	FIFESHIRE AVE	
KENT TCE (813)		09/12/2011	25971	PIRIE ST	ELLICE	
COURTENAY PL (386)		09/12/2011	6949	TORY ST	TARANAKI ST	
COURTENAY PL-NORTH (3054)		09/12/2011	5508	TARANAKI ST	TORY ST	
WATERLOO QUAY (1629)	WATERLOO QUAY 70m	13/12/2011	16728	WHITMORE ST	BUNNY ST	
WATERLOO QUAY (1629)		08/02/2012	14986	BUNNY ST	HINEMOA ST	
WILLIS ST (1666)	WILLIS ST 582m	09/02/2012	7201	DIXON ST	GHUZNEE ST	
THE TERRACE (1510)	THE TERRACE 225m	09/02/2012	8832	BOLTON ST	AURORA TCE	
THE TERRACE (1510)	THE TERRACE 1402m	09/02/2012	14629	MACDONALD CRES	GHUZNEE ST	
THE TERRACE (1510)	THE TERRACE 450m	09/02/2012	9643	SHELL LANE	DALMUIR LANE	
WILLIS ST (1666)	WILLIS ST 432m	10/02/2012	10773	FLAGSTAFF LANE	DIXON ST	
WILLIS ST (1666)		10/02/2012	7841	GHUZNEE ST	VIVIAN ST	
WAKEFIELD ST (1611)	WAKEFIELD ST 158m	10/02/2012	18444	CHAFFERS ST	ALLEN ST	
VICTORIA ST (1590)		15/02/2012	7599	HARRIS ST	MERCER ST	
WAKEFIELD ST (1611)		15/02/2012	6786	CUBA ST	VICTORIA ST	
KENT TCE (813)	KENT TCE 60m	15/02/2012	11227	WAKEFIELD ST	COURTENAY PL	
JERVOIS QUAY-WEST (3257)		16/02/2012	17076	POST OFFICE SQ	BRANDON ST	
RUAHINE ST (1329)	RUAHINE ST 200m	16/02/2012	31802	WELLINGTON RD	GOA ST	
RUAHINE ST (1329)	RUAHINE ST 705m	16/02/2012	31348	GOA ST	TAURIMA ST	
JERVOIS QUAY (768)		16/02/2012	16503	BRANDON ST	QUEENS WHARF	
BRODERICK RD (204)		21/02/2012	6007	BANNISTER AVE	CORTINA AVE	
BRODERICK RD (204)		29/02/2012	9300	BOULD ST	MOOREFIELD RD	
BRODERICK RD (204)		29/02/2012	6652	DR TAYLOR TCE	PHILLIP ST	
STEWART DR (1423)	STEWART DR 988m	08/03/2012	6712	TED GILBERD PL	HELSTON RD	
WAKEFIELD ST (1611)	WAKEFIELD ST 548m	13/03/2012	8808	TARANAKI ST	PRINGLE AVE	
WAKEFIELD ST (1611)		13/03/2012	19377	TORY ST	TARANAKI ST	
BOULCOTT ST (179)		13/03/2012	7630	WILLIS ST	CHURCH ST	
MOOREFIELD RD (1039)		22/03/2012	12363	STEPHEN ST	HAUMIA ST-MOOREFIELD RD RAB	
MOOREFIELD RD (1039)		23/03/2012	12184	BRODERICK RD	STEPHEN ST	
JERVOIS QUAY-WEST (3257)		28/03/2012	18100	HARRIS ST	WILLESTON ST	
JERVOIS QUAY (768)	JERVOIS QUAY 430m	28/03/2012	17752	WILLESTON ST	HARRIS ST	
JOHNSONVILLE RD (774)		28/03/2012	10270	DISRAELI ST	BRODERICK RD	
TORY ST (1536)	TORY ST 274m	29/03/2012	7455	COURTENAY PL	FORRESTERS LANE	
CUSTOMHOUSE QUAY (407)		29/03/2012	15983	WHITMORE ST	WARING TAYLOR ST	
HOROKIWI RD WEST (725)		03/05/2012	9468	NEWLANDS RD-BRACKEN RD RAB	KENMORE ST	
KHANDALLAH RD (817)		04/05/2012	11108	TARIKAKA ST	COLWAY ST	
NEWLANDS RD (1083)		10/05/2012	9239	WESTLEIGH WAY	HOROKIWI RD WEST-BRACKEN RD RAB	
STEWART DR (1423)		10/05/2012	5665	BRACKEN RD	BATCHELOR ST	
CASHMERE AVE (289)		11/05/2012	5763	RANUI CRES	RANUI CRES	
BOX HILL (186)		11/05/2012	11119	CLARK ST	NICHOLSON RD-COCKAYNE RD RAB	
STEWART DR (1423)		18/05/2012	6539	FITZPATRICK ST	TED GILBERD PL	
WILTON RD (1669)		22/05/2012	5918	GLOUCESTER ST	WARWICK ST	
CROFTON RD (396)		23/05/2012	8572	OTTAWA RD-WAIKOWHAI ST RAB	KENYA ST	
KENYA ST (815)		23/05/2012	8243	CROFTON RD	TRELISSICK CRES	
CHURCHILL DR (333)		08/06/2012	8741	SILVERSTREAM RD	CHARTWELL DR	
WILTON RD (1669)		08/06/2012	5941	SURREY ST	SHROPSHIRE AVE	
CHURCHILL DR (333)		08/06/2012	8316	CHARTWELL DR	BLACKBRIDGE RD	
HUTT RD (3402)	HUTT RD 1517m	14/06/2012	8876	WESTMINSTER ST	RANGIORA AVE	
NGAIO GORGE RD (1087)		21/06/2012	10534	PERTH ST	KAIWHARAWHARA RD	
HUTT RD (3402)		22/06/2012	7544	ONSLOW RD	JARDEN MILE	
RAROA RD (1264)		22/06/2012	6322	RAROA RD-#62 LOOP	NORNA CRES	
RAROA CRES (1263)		22/06/2012	5164	CHAYTOR ST	NORTHLAND TUNNEL RD	
SALAMANCA RD (1339)		22/06/2012	13670	THE TERRACE	MOUNT ST	
JOHNSONVILLE RD (774)	JOHNSONVILLE RD 318m	08/12/2012	15770	BRODERICK RD	HAWEA ST	Vehicles = 141932 / 142179 (99.83%)
MOOREFIELD RD (1039)	[049_001039_000455 2012-12-08] Moorefield	08/12/2012	11043	WANAKA ST	BRODERICK RD	Vehicles = 99387 / 99482 (99.90%)
BASSETT RD (124)	[049_000124_000078 2012-07-27] Bassett Rd	01/03/2013	5218	IRONSIDE RD	ANGELL ST	Vehicles = 36525 / 36534 (99.98%)
MIDDLETON RD (1003)	[049_001003_000306 2012-07-27] Middleton	01/03/2013	7446	HELSTON RD-BASSETT RD RAB	BURDENDALE GR	Vehicles = 52121 / 52154 (99.94%)
BURMA RD (231)	[049_000231_000378 2012-08-04] Burma Rd	02/03/2013	13455	MOOREFIELD RD-HAUMIA ST RAB	JOHN SIMS DR	Vehicles = 121095 / 121174 (99.93%)
FRASER AVE (560)	[049_000560_000233 2012-08-04] Fraser Ave	02/03/2013	5087	JOHNSONVILLE RD	POLLEN ST	Vehicles = 45783 / 45806 (99.95%)
HOROKIWI RD WEST (725)	[049_000725_000478 2013-03-02] Horokiwi R	02/03/2013	5167	BLOOMSBURY GR	BAYLANDS DR	Vehicles = 46499 / 46536 (99.92%)
MOOREFIELD RD (1039)	MOOREFIELD RD 198m	03/04/2013	14990	MOOREFIELD RD-JOHNSONVILLE RD RAB	FRANKMOORE AVE	Vehicles = 104930 / 105000 (99.93%)
NEWLANDS RD (1083)	[049_001083_000065 2012-07-20] Newlands	03/04/2013	14138	SH1 DIRECTION SIGN	HURRING PL	Vehicles = 98968 / 99011 (99.96%)
STEWART DR (1423)	[049_001423_000460 2012-08-14] Stewart Dr	03/04/2013	5278	LOASBY CRES	QUIGLEY ST	Vehicles = 36943 / 36955 (99.97%)
BRODERICK RD (204)	[049_000204_000098 2012-08-07] Broderick	11/04/2013	9399	JOHNSONVILLE RD	GOTHIC ST	Vehicles = 65793 / 65937 (99.78%)
MAIN RD (1973)	[049_001973_000176 2012-09-14] Main Rd O	12/04/2013	17212	WILLOWBANK RD	BOSCOBEL LANE	Vehicles = 120486 / 120541 (99.95%)
JOHNSONVILLE RD (774)	[049_000774_000174 2013-04-16] Johnsonvill	16/04/2013	19411	CORLETT ST	DISRAELI ST	Vehicles = 135877 / 136026 (99.89%)
HELSTON RD (679)	[049_000679_000277 2012-08-14] Helston Rd	09/05/2013	9005	PETHERICK CRES	STEWART DR	Vehicles = 72041 / 72049 (99.99%)
MAIN RD (1973)	[049_001973_001853 2013-05-09] Main Rd O	09/05/2013	14392	CAMBRIDGE ST-MAIN RD RAB	ESSEX ST	Vehicles = 115135 / 115274 (99.88%)
MAIN RD (1973)	[049_001973_001716 2013-05-09] Main Rd O	09/05/2013	14006	ELENA PL	CAMBRIDGE ST-MAIN RD RAB	Vehicles = 112044 / 112122 (99.93%)
MAIN RD (1973)	[049_001973_001405 2013-05-09] Main Rd O	09/05/2013	14604	THE DRIVE-MAIN RD RAB	OXFORD ST	Vehicles = 116834 / 116901 (99.94%)
MOLESWORTH ST (1025)	[049_001025_000516 2013-05-22] Molesworth	22/05/2013	9480	HAWKESTONE ST	MAY ST	Vehicles = 66362 / 66469 (99.84%)
BRODERICK RD (204)	[049_000204_000534 2012-08-07] Broderick	07/06/2013	6866	PHILLIP ST	BANNISTER AVE	Vehicles = 48061 / 48071 (99.98%)
ONSLOW RD (1134)	ONSLOW RD 1615m	07/06/2013	5273	BENARES ST	MANDALAY TCE	Vehicles = 36914 / 36921 (99.98%)
VICTORIA ST (1590)	[049_001590_000030 2013-06-11] Victoria St	11/06/2013	7560	HUNTER ST	WILLESTON ST	Vehicles = 52923 / 53064 (99.73%)
LENNEL RD (871)	[049_000871_000575 2013-06-19] Lennel Rd	19/06/2013	5739	MOORHOUSE ST	PITT ST	Vehicles = 40174 / 40176 (100.00%)
MULGRAVE ST (1057)	[049_001057_000030 2013-06-19] Mulgrave S	19/06/2013	8961	PIPITEA ST	AITKEN ST	Vehicles = 62729 / 63194 (99.26%)
PARK ST (1175)	[049_001175_000030 2013-06-19] Park St Ou	19/06/2013	7917	TINAKORI RD	BURNELL AVE	Vehicles = 55416 / 55514 (99.82%)
WADESTOWN RD (1599)	[049_001599_001353 2013-06-19] Wadestow	19/06/2013	5894	PITT ST	CECIL RD	Vehicles = 41261 / 41274 (99.97%)
GLENMORE ST (595)	[049_000595_000698 2013-06-25] Glenmore	25/06/2013	12267	ORANGI KAUPAPA RD	CRIEFF ST	Vehicles = 85872 / 85954 (99.90%)
OTTAWA RD (1154)	[049_001154_000175 2013-04-03] Ottawa Rd	25/06/2013	13341	AWARUA ST-OTTAWA RD RAB	OTTAWA RD-CROFTON RD RAB	Vehicles = 93388 / 93497 (99.88%)
RAROA RD (1264)	[049_001264_001532 2013-06-26] Raroa Rd	26/06/2013	6123	CLUNY AVE	RAROA CRES	Vehicles = 42864 / 42888 (99.94%)
UPLAND RD (1571)	[049_001571_000775 2013-06-26] Upland Rd	26/06/2013	10778	ST MICHAELS CRES	PLUNKET ST	Vehicles = 75448 / 75524 (99.90%)
BOWEN ST (184)	BOWEN ST 770m	27/06/2013	8795	SYDNEY ST WEST	TINAKORI RD	Vehicles = 61565 / 61587 (99.96%)
TINAKORI RD (1518)	[049_001518_001588 2013-07-03] Tinakori Rc	03/07/2013	10919	ASCOT ST	BOWEN ST	Vehicles = 76430 / 76625 (99.75%)
MURPHY ST (1058)	[049_001058_000430 2013-07-04] Murphy St	04/07/2013	10202	LITTLE PIPITEA ST	PIPITEA ST	Vehicles = 71415 / 71728 (99.56%)
TINAKORI RD (1518)	TINAKORI RD 40m	04/07/2013	9383	THORNDON QUAY	COTTLEVILLE TCE	Vehicles = 65683 / 65844 (99.76%)
TINAKORI RD (1518)	[049_001518_000857 2013-07-04] Tinakori Rc	04/07/2013	12922	TINAKORI RD-#146 LOOP	MALCOLM LANE	Vehicles = 90453 / 90495 (99.95%)
BOULCOTT ST (179)	[049_000179_000566 2013-07-05] Boulcott St	05/07/2013	5338	OVERBRIDGE 2ND ABUT	EVERTON TCE	Vehicles = 37365 / 37425 (99.84%)
CLIFTON TCE (343)	CLIFTON TCE 397m	05/07/2013	7625	SH 1 ONRAMP	EVERTON TCE	Vehicles = 53378 / 53406 (99.95%)
GLASGOW ST (588)	[049_000588_000080 2012-12-07] Glasgow S	05/07/2013	10750	KELBURN PDE	RAWHITI TCE	Vehicles = 75250 / 75322 (99.90%)
MAIN RD (1973)	[049_001973_002075 2013-04-12] Main Rd O	30/07/2013	13680	ESSEX ST	LINCOLN AVE	Vehicles = 95758 / 95862 (99.89%)
CENTENNIAL HIGHWAY-WEST (2142	[049_002142_000070 2013-02-08] Centennial	31/07/2013	12351	JARDEN MILE	CENTENNIAL HIGHWAY ON RAMP	Vehicles = 86456 / 87143 (99.21%)
CENTENNIAL HIGHWAY (9928)	[049_009928_000513 2013-02-08] Centennial	31/07/2013	12381	WIDTH CHANGE-END BARRIER LHS	JARDEN MILE	Vehicles = 86667 / 87138 (99.46%)
EVANS BAY PDE (509)	[049_000509_003921 2013-08-07] Evans Bay	07/08/2013	6889	WELLINGTON RD	KEMP ST	Vehicles = 48220 / 48267 (99.90%)
WALLACE ST (1615)	[049_001615_000590 2013-02-08] Wallace St	15/08/2013	19595	HOWARD ST	HUTCHISON RD	Vehicles = 137167 / 137247 (99.94%)
BOULCOTT ST (179)	[049_000179_000240 2013-08-16] Boulcott St	16/08/2013	7767	CHURCH ST	BOULCOTT ST-#71	Vehicles = 54366 / 54504 (99.75%)
JOHNSONVILLE RD (774)	[049_000774_000530 2013-04-11] Johnsonvill	17/08/2013	8405	BILL CUTTING PL	MOOREFIELD RD-JOHNSONVILLE RD RAB	Vehicles = 75642 / 76086 (99.42%)
THE TERRACE (1510)	[049_001510_000315 2013-08-17] The Terrac	17/08/2013	7928	AURORA TCE	SHELL LANE	Vehicles = 71349 / 71431 (99.89%)
THE TERRACE (1510)	[049_001510_000863 2013-08-22] The Terrac	22/08/2013	11808	EVERTON TCE	SALAMANCA RD	Vehicles = 94462 / 94484 (99.98%)
ADELAIDE RD (12)	[049_000012_000111 2013-05-14] Adelaide R	08/11/2013	10119	ALFRED ST	DOUGLAS ST	Vehicles = 70833 / 70873 (99.94%)
JERVOIS QUAY-WEST (3257)	[049_003257_000080 2013-08-08] Jervois Qu	19/11/2013	17956	TARANAKI ST	HARRIS ST	Vehicles = 125695 / 126867 (99.08%)
CUSTOMHOUSE QUAY-WEST (3300)	[049_003300_000110 2013-08-28] Customhou	19/11/2013	21589	JOHNSTON ST	WARING TAYLOR ST	Vehicles = 129533 / 130774 (99.05%)
CUSTOMHOUSE QUAY-WEST (3300)	CUSTOMHOUSE QUAY-WEST 160m	23/11/2013	19842	WARING TAYLOR ST	BALLANCE ST	Vehicles = 158736 / 159878 (99.29%)
KENT TCE (813)	[049_000813_000427 2014-02-20] Kent Tce C	20/02/2014	11031	ELIZABETH ST	PIRIE ST	Vehicles = 88248 / 89087 (99.06%)
CAMBRIDGE TCE (261)	[049_000261_000079 2014-02-20] Cambridge	20/02/2014	9695	BUCKLE ST	BARKER ST	Vehicles = 77556 / 78018 (99.41%)
MIDDLETON RD (1003)	[049_001003_000814 2013-10-18] Middleton	21/02/2014	6892	SILVERBIRCH GR	CHURTON DR	Vehicles = 48241 / 48257 (99.97%)
KAIWHARAWHARA RD (788)	[049_000788_000126 2013-07-30] Kaiwharaw	25/02/2014	6620	PICKERING ST	CAMERON ST	Vehicles = 59578 / 59664 (99.86%)
BOWEN ST (184)	[049_000184_000117 2013-08-23] Bowen St	25/02/2014	6452	LAMBTON QUAY	THE TERRACE	Vehicles = 58064 / 58325 (99.55%)
HUTT RD-CBD (3401)	[049_003401_000951 2013-03-12] Hutt Rd Ou	07/03/2014	13168	AOTEA QUAY-END ISL LHS	SCHOOL RD	Vehicles = 92179 / 92421 (99.74%)
HAPPY VALLEY RD (645)	[049_000645_001299 2013-10-31] Happy Vall	07/03/2014	5832	MURCHISON ST	LANDFILL RD	Vehicles = 40825 / 40864 (99.90%)
CHAYTOR ST (308)	CHAYTOR ST 531m	11/03/2014	14956	CURTIS ST	OLD KARORI RD	Vehicles = 104692 / 104865 (99.84%)
CRAWFORD RD (392)	[049_000392_000070 2013-08-07] Crawford R	14/03/2014	18117	ALEXANDRA RD	WELLINGTON RD-CRAWFORD RD RAB	Vehicles = 126822 / 126996 (99.86%)
KELBURN PDE (805)	[049_000805_000050 2013-03-21] Kelburn Pd	19/03/2014	14726	SALAMANCA RD	GLASGOW ST	Vehicles = 103082 / 103145 (99.94%)
BROOKLYN RD (208)	[049_000208_000605 2013-03-09] Brooklyn R	19/03/2014	6197	NAIRN ST	BIDWILL ST	Vehicles = 43380 / 43409 (99.93%)
WATERLOO QUAY (1629)	[049_001629_000799 2013-03-13] Waterloo C	20/03/2014	14971	HINEMOA ST	CORNWELL ST	Vehicles = 104796 / 105379 (99.45%)
MOLESWORTH ST (1025)	[049_001025_000040 2013-03-20] Molesworth	21/03/2014	7301	LAMBTON QUAY	KATE SHEPPARD PL	Vehicles = 51108 / 51134 (99.95%)
BOWEN ST (184)	[049_000184_000228 2013-03-12] Bowen St	21/03/2014	9366	THE TERRACE	BALLANTRAE PL	Vehicles = 65561 / 65839 (99.58%)
GLENMORE ST (595)	[049_000595_000377 2013-10-31] Glenmore	25/03/2014	15440	PATANGA CRES	GARDEN RD	Vehicles = 108078 / 108149 (99.93%)
CURTIS ST (406)	[049_000406_000807 2013-06-25] Curtis St C	25/03/2014	6658	LAMBETH RD	WALLWORTH RD	Vehicles = 46605 / 46626 (99.95%)
RAROA RD (1264)	[049_001264_000362 2013-10-18] Raroa Rd 1	26/03/2014	6522	ENTRANCE ST	MT PLEASANT RD	Vehicles = 45654 / 45671 (99.96%)
GRANT RD (614)	[049_000614_000374 2013-08-17] Grant Rd C	27/03/2014	7062	GRANT RD-SLIP	PARK ST	Vehicles = 49436 / 49466 (99.94%)
ARO ST (77)	ARO ST 30m	01/04/2014	8277	WILLIS ST	OHIRO RD	Vehicles = 57940 / 58045 (99.82%)
EVANS BAY PDE (509)	[049_000509_002045 2013-09-20] Evans Bay	02/04/2014	9928	MAIDA VALE RD	RATA RD	Vehicles = 79423 / 79483 (99.92%)
BROADWAY (201)	[049_000201_001149 2013-11-08] Broadway	03/04/2014	7671	BENTINCK AVE	TIO TIO RD	Vehicles = 53695 / 53710 (99.97%)
CRAWFORD RD (392)	[049_000392_000556 2013-11-08] Crawford R	21/05/2014	12989	DUNCAN TCE	DUNCAN TCE	Vehicles = 90926 / 91164 (99.74%)
TINAKORI RD (1518)	[049_001518_001648 2013-07-03] Tinakori Rc	21/05/2014	14981	BOWEN ST	ST MARY ST	Vehicles = 104865 / 105094 (99.78%)
THE PARADE (1505)	[049_001505_000625 2014-06-05] The Parade	05/06/2014	9865	AVON ST	MEDWAY ST	Vehicles = 78921 / 78990 (99.91%)
LUXFORD ST (908)	LUXFORD ST 116m	18/06/2014	7486	RINTOUL ST	ADELAIDE RD	Vehicles = 52399 / 52420 (99.96%)
WARIPORI ST (1621)	[049_001621_000146 2014-06-25] Waripori St	25/06/2014	6255	RUSSELL TCE	RINTOUL ST	Vehicles = 43783 / 43814 (99.93%)
QUEENS DR (1237)	[047_001237_001447 2014-07-24] Queens Dr	24/07/2014	7200	LYALL PDE-QUEENS DR RAB	SUTHERLAND RD	Vehicles = 50402 / 50422 (99.96%)
ARO ST (77)	ARO ST 338m	08/08/2014	9969	ALAMEDA TCE	DEVON ST	Vehicles = 69781 / 69873 (99.87%)
MEIN ST (993)	[047_000993_000070 2014-08-13] Mein St Ou	13/08/2014	6630	RIDDIFORD ST	MINERVA ST	Vehicles = 46407 / 46556 (99.68%)
RUSSELL TCE (1334)	[047_001334_000162 2014-08-15] Russell Tc	15/08/2014	10584	RIDDIFORD ST-MANSFIELD ST RAB	WARIPORI ST	Vehicles = 74086 / 74097 (99.99%)
RIDDIFORD ST (1294)	[047_001294_001011 2014-08-22] Riddiford S	22/08/2014	11972	GORDON ST	ARNEY ST	Vehicles = 83807 / 83852 (99.95%)
RIDDIFORD ST (1294)	[047_001294_000189 2014-08-29] Riddiford	29/08/2014	10266	ADELAIDE RD	REGINA TCE	Vehicles = 71863 / 72017 (99.79%)
RIDDIFORD ST (1294)	RIDDIFORD ST 611m	29/08/2014	16485	GREEN ST	WILSON ST	Vehicles = 115398 / 115594 (99.83%)
MAIN RD (1973)	[049_001973_004092 2012-08-24] Main Rd 3	09/09/2014	15487	GEE ST	WALL PL	Vehicles = 108409 / 108463 (99.95%)
WILTON RD (1669)	WILTON RD 100m	09/09/2014	6040	ALBEMARLE RD	WORCESTER ST	Vehicles = 42280 / 42294 (99.97%)
WAIKOWHAI ST (1603)	[049_001603_000379 2012-09-07] Waikowhai	09/09/2014	9343	OTTAWA RD-CROFTON RD RAB	BENDBROOK WAY	Vehicles = 65401 / 65459 (99.91%)
ONSLOW RD (1134)	[049_001134_000743 2012-09-08] Onslow Rd	09/09/2014	5637	HUTT RD	HOMEBUSH RD	Vehicles = 39457 / 39470 (99.97%)
CHURCHILL DR (333)	[049_000333_001591 2012-09-07] Churchill D	09/09/2014	5679	WILTON BUSH RD	WILTON RD	Vehicles = 39752 / 39766 (99.96%)
BURMA RD (231)	BURMA RD 950m	09/09/2014	12561	FRASER AVE	MALDIVE ST	Vehicles = 87929 / 87989 (99.93%)
BOX HILL (186)	[049_000186_000146 2012-09-07] Box Hill Ou	09/09/2014	10546	STATION RD	WOODMANCOTE RD	Vehicles = 73819 / 73869 (99.93%)
NEWLANDS RD (1083)	[049_001083_000379 2013-09-20] Newlands	10/09/2014	13323	HURRING PL	WAKELY RD	Vehicles = 93264 / 93298 (99.96%)
MOLESWORTH ST (1025)	[049_001025_000248 2012-09-08] Molesworth	10/09/2014	8094	HILL ST	PIPITEA ST	Vehicles = 56656 / 56742 (99.85%)
HELSTON RD (679)	HELSTON RD 30m	10/09/2014	11209	MIDDLETON RD-BASSETT RD RAB	WEST BRIDGE 1ST ABUT	Vehicles = 78462 / 78517 (99.93%)
ONEPU RD (1133)	[047_001133_000169 2014-09-11] Onepu Rd	11/09/2014	7795	RONGOTAI RD	COUTTS ST	Vehicles = 54564 / 54617 (99.90%)
RONGOTAI RD-SOUTH (9940)	RONGOTAI RD-SOUTH 600m	16/09/2014	6529	YULE ST	ROSS ST	Vehicles = 45705 / 45741 (99.92%)
RONGOTAI RD (1309)	[047_001309_000634 2014-09-16] Rongotai R	16/09/2014	6060	ROSS ST	TROY ST-WEST	Vehicles = 42423 / 42445 (99.95%)
COUTTS ST (388)	[047_000388_000083 2014-09-16] Coutts St C	16/09/2014	5799	BAY RD	ONEPU RD	Vehicles = 40594 / 40704 (99.73%)
MAIN RD (1973)	[049_001973_002175 2012-10-25] Main Rd O	17/09/2014	14885	LINCOLN AVE	SURREY ST	Vehicles = 104193 / 104580 (99.63%)
CHILDERS TCE (324)	[047_000324_000221 2014-09-17] Childers Tc	17/09/2014	7160	RONGOTAI RD	RODRIGO RD	Vehicles = 50119 / 50163 (99.91%)
KILBIRNIE CRES (820)	KILBIRNIE CRES 598m	18/09/2014	7971	CHILDERS TCE	EVANS BAY PDE	Vehicles = 55799 / 55849 (99.91%)
KILBIRNIE CRES (820)	[047_000820_000060 2014-09-18] Kilbirnie Cr	18/09/2014	8770	WELLINGTON RD	HENRY ST	Vehicles = 61389 / 61457 (99.89%)
CRAWFORD RD (392)	[047_000392_000356 2014-09-18] Crawford R	18/09/2014	12997	WELLINGTON RD-CRAWFORD RD RAB	DUNCAN TCE	Vehicles = 90976 / 91014 (99.96%)
QUEENS DR (1237)	[047_001237_000126 2014-09-19] Queens Dr	19/09/2014	5158	CRUICKSHANK ST	COCKBURN ST	Vehicles = 36106 / 36125 (99.95%)
TROY ST-EAST (9948)	[047_009948_000105 2014-09-24] Troy St - E	24/09/2014	8570	COBHAM DR-TROY ST RAB	SALEK ST	Vehicles = 59987 / 60040 (99.91%)
RONGOTAI RD-SOUTH (9940)	[047_009940_000791 2014-09-24] Rongotai R	24/09/2014	6314	MAHORA ST	ONEPU RD	Vehicles = 44199 / 44307 (99.76%)
ORIENTAL PDE (1147)	[047_001147_000475 2014-09-24] Oriental Pc	24/09/2014	15882	HERD ST	ORIENTAL PDE-#186	Vehicles = 111171 / 111276 (99.91%)
TARANAKI ST (1477)	TARANAKI ST 1322m	26/09/2014	17626	WIDTH CHANGE	HANKEY ST	Vehicles = 123384 / 123538 (99.88%)

GROSVENOR TCE (621)	[049_000621_000201 2013-10-17] Grosvenor	11/10/2014	6406	GRANT RD	LOWER WATT ST	Vehicles = 76871 / 76891 (99.97%)
EVANS BAY PDE (509)	[049_000509_000300 2013-10-17] Evans Bay	11/10/2014	10346	ORIENTAL PDE	MAIDA VALE RD	Vehicles = 134492 / 134648 (99.88%)
BROADWAY (201)	BROADWAY 63m	11/10/2014	13015	CALABAR RD-BROADWAY RAB	KAURI ST	Vehicles = 169189 / 169295 (99.94%)
ADELAIDE RD (12)	[049_000012_002920 2013-03-12] Adelaide R	11/10/2014	11650	DUPPA ST	DOVER ST	Vehicles = 139805 / 139856 (99.96%)
EVANS BAY PDE-SOUTH (3078)	[047_003078_000020 2014-10-14] Evans Bay	14/10/2014	5193	RONGOTAI RD	BAY RD	Vehicles = 51934 / 52010 (99.85%)
KARORI TUNNEL (9984)	[049_009984_000098 2013-12-05] Karori Tunn	15/10/2014	16051	GLENMORE ST	WAIAPU RD	Vehicles = 144460 / 144620 (99.89%)
MIRAMAR AVE (1015)	[049_001015_000040 2013-10-16] Miramar Av	15/10/2014	10618	SHELLY BAY RD	MAUPUIA RD	Vehicles = 95561 / 95590 (99.97%)
BURMA RD (231)	BURMA RD 870m	05/11/2014	12230	JOHN SIMS DR	FRASER AVE	Vehicles = 85609 / 85691 (99.90%)
TIRANGI RD (1520)	[047_001520_000583 2014-11-11] Tirangi Rd	11/11/2014	9197	COUTTS ST	KINGSFORD SMITH ST	Vehicles = 64379 / 64418 (99.94%)
BROOKLYN RD (208)	BROOKLYN RD 1228m	18/11/2014	7630	WASHINGTON AVE	OHIRO RD	Vehicles = 76295 / 76362 (99.91%)
COUTTS ST (388)	[047_000388_000878 2014-11-19] Coutts St C	19/11/2014	9767	MAMARI ST	TIRANGI RD	Vehicles = 68367 / 68415 (99.93%)
ADELAIDE RD (12)	[049_000012_000633 2013-03-21] Adeaide Ro	21/11/2014	11926	HOSPITAL RD	JOHN ST	Vehicles = 83483 / 83568 (99.90%)
ADELAIDE RD (12)	[049_000012_002196 2014-06-19] Adelaide R	21/11/2014	14981	LUXFORD ST	BRITOMART ST	Vehicles = 104870 / 104986 (99.89%)
OHIRO RD (1122)	[049_001122_001277 2014-05-07] Ohiro Rd C	26/11/2014	9093	TODMAN ST	MCKINLEY CRES	Vehicles = 63651 / 63736 (99.87%)
ADELAIDE RD (12)	[047_000012_000804 2014-12-12] Adelaide R	12/12/2014	10594	JOHN ST	NIKAU ST	Vehicles = 74157 / 74266 (99.85%)
CONSTABLE ST (371)	[047_000371_000189 2014-12-12] Constable S	12/12/2014	12001	RIDDIFORD ST	DANIELL ST	Vehicles = 84010 / 84118 (99.87%)
CONSTABLE ST (371)	CONSTABLE ST 367m	12/12/2014	15271	DANIELL ST	OWEN ST	Vehicles = 106894 / 107000 (99.90%)
OHIRO RD (1122)	[049_001122_001091 2014-05-07] Ohiro Rd C	12/12/2014	11821	TANERA CRES	TODMAN ST	Vehicles = 82745 / 82845 (99.88%)
LYALL PDE (912)	[047_000912_000795 2014-07-22] Lyall Pde C	19/02/2015	7658	KINGSFORD SMITH ST	ONEPU RD-LYALL PDE RAB	Vehicles = 53607 / 53667 (99.89%)
LYALL PDE (912)	[047_000912_000912 2014-07-22] Lyall Pde C	19/02/2015	9552	ONEPU RD-LYALL PDE RAB	RUA ST	Vehicles = 66863 / 66933 (99.90%)
ONEPU RD (1133)	[047_001133_001141 2014-07-22] Onepu Rd	19/02/2015	6485	APU CRES	LYALL PDE-ONEPU RD RAB	Vehicles = 45396 / 45449 (99.88%)

Datasets: Summary

Cat_Code	Title	Url	Agency	Description
1100	Twitter search for #waitangipark	http://backtweets.com/search/?q=%23waitangipark	Twitter	
1100	Facebook search for #waitangipark	https://www.facebook.com/search/top/?q=%23waitangipark	Facebook	
1100	Tumblr search	https://www.tumblr.com/search/waitangi+park	Tumblr	
1200	Blogs	http://www.wellurban.org.nz/urbaneye/waitangi_park.html http://wellurban.blogspot.co.nz/2006/01/waiting-for-waitangi.html http://wellurban.blogspot.co.nz/2007/09/pass-mark-for-park.html https://blogisthmus.wordpress.com/2012/03/15/competition-or-collaboration/ http://envirohistorynz.com/2010/12/12/waitangi-park-an-urban-wetland-recreated/ http://www.urbanfieldstudies.net/2009/11/arguments-for-and-against-graffiti/ http://eyeofthefish.org/waitangi/	Various	
1400	Instagram search for #waitangipark	https://www.instagram.com/explore/tags/waitangipark/	Instagram	Site location = 395880
1500	YouTube search	https://www.youtube.com/results?search_query=waitangi+park	YouTube	
1600	Internet search	https://www.google.co.nz/search?q=waitangi+park&oq=waitangi+park&aqs=chrome..69	Google	key word "waitangi park"
21002	nz placenames march 2008	https://koordinates.com/layer/284-nz-placenames-march-2008/	Land Information New Zealand	
21002	Wellington City Sculptures	https://koordinates.com/layer/2221-wellington-city-sculptures/	Wellington City Council	<p>This dataset contains sculptures in areas owned/maintained by Parks & Gardens Business Unit, Wellington City Council. The development of this
21007	Absolute contribution of key sources	https://data.mfe.govt.nz/table/2446-absolute-contribution-of-key-sources/	Ministry for the Environment (MfE)	<p>Burning wood and coal for home heating, road motor vehicle use, industrial activities, and household outdoor burning are the key human-made s Measuring the contribution of each source helps us understand their pressures on our air quality. It also provides context for changes in emissions fr
21007	Contribution of industry to key pollutants	https://data.mfe.govt.nz/table/2452-contribution-of-industry-to-key-pollutants/	Ministry for the Environment (MfE)	Industrial activities emit a range of pollutants that affect our air quality. The health effects associated with exposure to these pollutants range fro
21007	Contribution to PM10 Ã¢â,¬â€œ Selected Locations	https://data.mfe.govt.nz/table/2130-contribution-to-pm10-selected-locations/	Ministry for the Environment (MfE)	<p>Note: PM10 concentrations are given in micrograms per cubic metre of air, or A,Aµg/m3. </p> <p>Source: Institute of Geological and Nuclear Sciences. Regional councils of Wellington,
21007	Relative contribution of key sources	https://data.mfe.govt.nz/table/2434-relative-contribution-of-key-sources/	Ministry for the Environment (MfE)	<p>Burning wood and coal for home heating, road motor vehicle use, industrial activities, and household outdoor burning are the key human-made s Measuring the relative contribution of each source helps us understand their pressures on our air quality. It also provides context for changes in emis
21008	Airsheds Exceeding PM10 National Standard (2+ days/year)	https://data.mfe.govt.nz/table/2138-airsheds-exceeding-pm10-national-standard-	Ministry for the Environment (MfE)	<p>Source: Regional councils of Northland, Bay of Plenty, Waikato, Hawke's Bay, Manawatu-Wanganui, Wellington, Canterbury, West Coast, Otago, S
21008	Annual and Daily column ozone Dobson spectrophotometer measurements (1987Ã¢â,¬â€œ2013)	https://data.mfe.govt.nz/table/2562-annual-and-daily-column-ozone-dobson-	Ministry for the Environment (MfE)	<p>Ozone (O3) is a gas that is of interest in two regions of EarthA¢a,¬a„¢s atmosphere A¢a,¬a€œ at ground level and in the upper atmosphere (strat skin cancer. Monitoring variations in stratospheric ozone concentrations is important in New Zealand as we have high rates of skin cancers.
21008	Annual Average Nitrogen Dioxide Concentration	https://data.mfe.govt.nz/table/2125-annual-average-nitrogen-dioxide-concentration/	Ministry for the Environment (MfE)	Note: Nitrogen dioxide concentrations are given in micrograms per cubic metre of air, or A,Aµg/m3. Source: Auckland Council, Wellington Regional Council
21008	Annual Average PM10 Concentration - Cities	https://data.mfe.govt.nz/table/2133-annual-average-pm10-concentration-cities/	Ministry for the Environment (MfE)	Greater than 100,000 people. Average is population weighted average of monitoring sites in cities.
21008	Annual Average PM10 Concentration in Air	https://data.mfe.govt.nz/table/2124-annual-average-pm10-concentration-in-air/	Ministry for the Environment (MfE)	<p>PM10 concentrations are given in micrograms per cubic.</p> <p>Source:
21008	Annual Average PM2.5 Concentration	https://data.mfe.govt.nz/table/2139-annual-average-pm25-concentration/	Ministry for the Environment (MfE)	Note: PM2.5 concentrations are given in micrograms per cubic metre of air, or A,Aµg/m3. Source: Regional councils of Wellington, Canterbury; Auckland Council
21008	Carbon dioxide concentrations at Baring Head (1972Ã¢â,¬â€œ2013)	https://data.mfe.govt.nz/table/2568-carbon-dioxide-concentrations-at-baring-head-	Ministry for the Environment (MfE)	<p>Greenhouse gases (GHGs) in the atmosphere absorb heat radiating from Earth, warming the atmosphere. Emissions from human activities increa levels, and glacier melt. Monitoring GHG concentrations allows us to infer long-term impacts on ocean acidity, temperature, sea level, and glaciers.<b
21008	Carbon monoxide concentrations at Baring Head (2000Ã¢â,¬â€œ13)	https://data.mfe.govt.nz/table/2569-carbon-monoxide-concentrations-at-baring-head-	Ministry for the Environment (MfE)	<p>Greenhouse gases (GHGs) in the atmosphere absorb heat radiating from Earth, warming the atmosphere. Emissions from human activities increa levels, and glacier melt. Monitoring GHG concentrations allows us to infer long-term impacts on ocean acidity, temperature, sea level, and glaciers.<b
21008	Daily average column ozone by DOY (1978Ã¢â,¬â€œ2013)	https://data.mfe.govt.nz/table/2559-daily-average-column-ozone-by-doy-19782013/	Ministry for the Environment (MfE)	<p>Ozone (O3) is a gas that is of interest in two regions of EarthA¢a,¬a„¢s atmosphere A¢a,¬a€œ at ground level and in the upper atmosphere (strat skin cancer. Monitoring variations in stratospheric ozone concentrations is important in New Zealand as we have high rates of skin cancers.
21008	Daily peak, noon, and SED UV (UVM dataset)	https://data.mfe.govt.nz/table/2583-daily-peak-noon-and-sed-uv-uvm-dataset/	Ministry for the Environment (MfE)	<p>Too much exposure to the sun's ultraviolet (UV) radiation can cause skin cancer. Ozone absorbs some UV radiation, and UV levels can vary in rela The most reliable data on solar UV irradiance in New Zealand are from spectroradiometers developed and operated by NIWA at Lauder since summe
21008	Day of year column ozone Dobson spectrophotometer measurements (1987Ã¢â,¬â€œ2013)	https://data.mfe.govt.nz/table/2561-day-of-year-column-ozone-dobson-	Ministry for the Environment (MfE)	<p>Ozone (O3) is a gas that is of interest in two regions of EarthA¢a,¬a„¢s atmosphere A¢a,¬a€œ at ground level and in the upper atmosphere (strat skin cancer. Monitoring variations in stratospheric ozone concentrations is important in New Zealand as we have high rates of skin cancers.
21008	Methane concentrations at Baring Head (1989Ã¢â,¬â€œ2013)	https://data.mfe.govt.nz/table/2570-methane-concentrations-at-baring-head-	Ministry for the Environment (MfE)	<p>Greenhouse gases (GHGs) in the atmosphere absorb heat radiating from Earth, warming the atmosphere. Emissions from human activities increa levels, and glacier melt. monitoring GHG concentrations allows us to infer long-term impacts on ocean acidity, temperature, sea level, and glaciers.<b
21008	Ozone, Lauder, assimilated series (1978-2013)	https://data.mfe.govt.nz/table/2560-ozone-lauder-assimilated-series-1978-2013/	Ministry for the Environment (MfE)	<p>Ozone (O3) is a gas that is of interest in two regions of EarthA¢a,¬a„¢s atmosphere A¢a,¬a€œ at ground level and in the upper atmosphere (strat skin cancer. Monitoring variations in stratospheric ozone concentrations is important in New Zealand as we have high rates of skin cancers.
21008	Potential Flood Hazards	https://koordinates.com/layer/2136-potential-flood-hazards/	Wellington City Council	<p>This dataset contains the Potential Flood Hazards Wellington City may experience. It is derived from a combination of historical data and infomati
21008	River Environment Classification Watershed Wellington (2010)	https://data.mfe.govt.nz/layer/1832-river-environment-classification-watershed-	Ministry for the Environment (MfE)	<p>The New Zealand River Environment Classification (REC) organises information about the physical characteristics of New Zealand's rivers. Individu forest, pasture or urban. Sections of river that have similar ecological characteristics can then be grouped together, no matter where they are.
21008	Total column ozone, Lauder, assimilated series (1978-2013)	https://data.mfe.govt.nz/table/2557-total-column-ozone-lauder-assimilated-series-	Ministry for the Environment (MfE)	<p>Ozone (O3) is a gas that is of interest in two regions of EarthA¢a,¬a„¢s atmosphere A¢a,¬a€œ at ground level and in the upper atmosphere (strat skin cancer. Monitoring variations in stratospheric ozone concentrations is important in New Zealand as we have high rates of skin cancers.
21008	Wellington City Tsunami Evacuation Zones	https://koordinates.com/layer/1701-wellington-city-tsunami-evacuation-zones/	Wellington City Council	The tsunami evacuation zones are designed to encompass the range of inundation patterns for many individual possible tsunami. The use of tsun
21008	Wellington City Wind Zones	https://koordinates.com/layer/1443-wellington-city-wind-zones/	Wellington City Council	<p>Wind Zones for the Wellington City Urban Areas using NZS3604:2011. When applying for a building consent, the wind zone in which a structure is requirements (New Zealand Building Code - NZBC B1 - Structure) and weather tight requirements (NZBC E2 - External Moisture). Wind zone informat
21011	Accessible waterfront route	https://koordinates.com/layer/2229-accessible-waterfront-route/	Wellington City Council	The accessible waterfront route represents the most appropriate accessible route for persons with disabilities to travel along the waterfront. Wr
21011	NZ Police Station Boundaries	https://koordinates.com/layer/3826-nz-police-station-boundaries/	New Zealand Police	New Zealand Police administrative boundaries go out to the 12NM limit and are made up of 12 Police Districts which are divided into Areas. Each
21011	Public convenience	https://koordinates.com/layer/2219-public-convenience/	Wellington City Council	Points representing Public Conveniences available to the public and administered by Wellington City Council including accessible public convenier
21011	Wellington City Civil Defence Centres	https://koordinates.com/layer/1452-wellington-city-civil-defence-centres/	Wellington City Council	Points representing the location of Wellington City Civil Defence Centres.
21011	Wellington City Community Centres	https://koordinates.com/layer/1444-wellington-city-community-centres/	Wellington City Council	Points representing Wellington City Community Centres.
21011	Wellington City Community Halls	https://koordinates.com/layer/1445-wellington-city-community-halls/	Wellington City Council	Points representing Wellington City Community Halls.
21011	Wellington City Council Kerbs	https://koordinates.com/layer/1478-wellington-city-council-kerbs/	Wellington City Council	<p>Lines representing kerb lines, edge of seal and traffic islands over urban Wellington including Makara Beach and Makara Village. Captured in 1996
21011	Wellington City Council Private Sewer Pipes 2	https://koordinates.com/layer/6030-wellington-city-council-private-sewer-pipes-	Wellington City Council	Wellington City Council Private Sewer Pipes
21011	Wellington City Council Private Stormwater Pipe	https://koordinates.com/layer/3840-wellington-city-council-private-stormwater-	Wellington City Council	Wellington City Council Private Stormwater Pipes
21011	Wellington City Council Private Water Pipe	https://koordinates.com/layer/3838-wellington-city-council-private-water-pipe/	Wellington City Council	Wellington City Council Private Water Pipes
21011	Wellington City Council Stormwater Node	https://koordinates.com/layer/3924-wellington-city-council-stormwater-node/	Wellington City Council	Wellington City Council Stormwater Nodes
21011	Wellington City Council Stormwater Pipe	https://koordinates.com/layer/3837-wellington-city-council-stormwater-pipe/	Wellington City Council	Wellington City Council Stormwater Pipes
21011	Wellington City Council Wastewater Pipe	https://koordinates.com/layer/3836-wellington-city-council-wastewater-pipe/	Wellington City Council	Wellington City Council Sewer Network Pipes
21011	Wellington City Council Water Network Pipe	https://koordinates.com/layer/3834-wellington-city-council-water-network-pipe/	Wellington City Council	Wellington City Council Water Network Pipes
21011	Wellington City Council Water Service Pipe	https://koordinates.com/layer/3835-wellington-city-council-water-service-pipe/	Wellington City Council	Wellington City Council Water Service Pipes
21011	Wellington City Dog Exercise Areas (2009)	https://koordinates.com/layer/2217-wellington-city-dog-exercise-areas-2009/	Wellington City Council	<p>Dog control areas based on Wellington City Council Dog Policy 2009. Includes off leash areas, and on or off leash areas where restrictions apply.</
21011	Wellington City Libraries	https://koordinates.com/layer/1446-wellington-city-libraries/	Wellington City Council	Points representing Wellington City Libraries.
21011	Wellington City Mobility Car Parks	http://koordinates.com/layer/2231-wellington-city-mobility-car-parks/	Wellington City Council	Points representing Wellington City Mobility Car Parks.
21011	Wellington City Mobility Scooter Locations	https://koordinates.com/layer/2232-wellington-city-mobility-scooter-locations/	Wellington City Council	Points representing mobility scooter locations in Wellington.
21011	Wellington City Park, Reserve or Cemetery	https://koordinates.com/layer/2216-wellington-city-park-reserve-or-cemetery/	Wellington City Council	Polygons representing Parks, Reserves and Cemeteries administered by Wellington City Council
21011	Wellington City Playgrounds	https://koordinates.com/layer/2218-wellington-city-playgrounds/	Wellington City Council	Points representing the location of public playground areas in the Wellington City administered by Wellington City Council. Includes accessible pu
21011	Wellington City Recreation Centres	https://koordinates.com/layer/1447-wellington-city-recreation-centres/	Wellington City Council	Points representing Wellington City Council Recreation Centres.
21011	Wellington City Recycling Centres	https://koordinates.com/layer/1448-wellington-city-recycling-centres/	Wellington City Council	Points representing recycling Centres administered by the Wellington City Council
21011	Wellington City Service Centre	https://koordinates.com/layer/1449-wellington-city-service-centre/	Wellington City Council	Point representing the Service Centre for the Wellington City Council. You can do most of your Council business at the City Service Centre.
21011	Wellington City Sportsgrounds	https://koordinates.com/layer/2220-wellington-city-sportsgrounds/	Wellington City Council	This dataset contains all Sportsfields built/maintained/owned/used by Wellington City Council.
21011	Wellington City Suburbs	https://koordinates.com/layer/1431-wellington-city-suburbs/	Wellington City Council	<p>Polygons representing Wellington Suburbs. The official list of suburbs was defined in 2003 after public consultation. Small modifications to subu
21011	Wellington City Swimming Pools	https://koordinates.com/layer/1450-wellington-city-swimming-pools/	Wellington City Council	Points representing swimming pools administered by Wellington City Council. The Council owns and operates seven swimming pools - five indoo
21011	Wellington City Wheelchair Access To Beach	https://koordinates.com/layer/2233-wellington-city-wheelchair-access-to-beach/	Wellington City Council	Points representing locations where there is wheelchair access to the beach.
		http://nzdotstat.stats.govt.nz/WBOS/Index.a		

Cat_Code	Title	Url	Agency	Description
21012	Annual Recorded Offences for the latest Calendar Years (ANZSOC) - Wellington Area	spx?DataSetCode=TABLECODE7405	Statistics NZ	
21012	Traffic Offences - NZ 1999-2015	https://fyi.org.nz/request/4300/response/14183/attach/4/Ross%20p%2016%206681%20s	New Zealand Police	
21013	16 Wellington 15m DEM (NZSoSDEM v1.0)	https://koordinates.com/layer/3743-16-wellington-15m-dem-nzsosdem-v10/	University of Otago - National School of Surveying	NZDEM_SoS_v1.0 is a Digital Elevation Model (DEM) covering the whole of New Zealand at a spatial resolution of 15m, created by the School of S
21013	1900 Thomas Ward Maps	https://koordinates.com/layer/4233-1900-thomas-ward-maps/	Wellington City Council	Thomas Ward - Authorised Surveyors: Map of the City of Wellington - January 1891- clipped, georeferenced and rectified in July 2011
21013	2015 Wellington Land and Property Values	Manually entered from:	Wellington City Council	
21013	NZ Property Titles	https://data.linz.govt.nz/layer/804-nz-property-titles/	Land Information New Zealand	<p>This layer provides title information (excluding ownership) where there is a data link to one or more primary parcels.</p> <p>A title is a record of all estates, encumbrances and easements that affect a piece of land. These are now known as Computer Registers incorporat
21013	NZLRI Land Use Capability	https://iris.scinfo.org.nz/layer/76-nzlri-land-use-capability/	Landcare Research	The New Zealand Land Resource Inventory (NZLRI) is a national database of physical land resource information. It comprises two sets of data com
21013	NZLRI North Island, Edition 2 (all attributes)	https://iris.scinfo.org.nz/layer/134-nzlri-north-island-edition-2-all-attributes/	Landcare Research	The New Zealand Land Resource Inventory (NZLRI) is a national database of physical land resource information. It comprises two sets of data com
21013	Soil types	http://db.nzsee.org.nz/2011/007.pdf	GNS Science	
21013	Wellington 0.1m Urban Aerial Photos (2012-2013)	https://data.linz.govt.nz/layer/1871-wellington-01m-urban-aerial-photos-2012-	Land Information New Zealand	Orthophotography for the Wellington City Council taken during 2012 and 2013. Area of Coverage: Central Wellington, Mt Cook, Newtown and sel
21013	Wellington City 1m Contours (2011)	https://koordinates.com/layer/3774-wellington-city-1m-contours-2011/	Wellington City Council	1m contours covering Central Wellington, Wellington Airport, Churton Park, Grenada North, Woodridge and other selected tiles.
21013	Wellington City Building Footprints	https://koordinates.com/layer/1474-wellington-city-building-footprints/	Wellington City Council	Polygons representing building rooftop outlines for urban Wellington including Makara Beach and Makara Village. Each building has an associated 1998, 1999, 2002, 2006, 2009, 2011 and 2012 in conjunction with aerial photography refly projects.
21013	Wellington City Corrosion Zone	https://koordinates.com/layer/3707-wellington-city-corrosion-zone/	Wellington City Council	Wellington Corrosion Zone as 500m buffer from coastline.
21013	Wellington Region Combined Earthquake Hazard	https://koordinates.com/layer/4071-wellington-region-combined-earthquake-	Greater Wellington Regional Council	<p>This Combined Earthquake hazard shapefile is a compilation of all "combined earthquake hazard" ArcInfo coverages in major urban areas of the W 3: Ground shaking 4: Liquefaction potential 5: Slope failure. Map publication reference: WRC/RP-T-96/15 For notes on how this coverage was created
21013	Wellington Region Earthquake Induced Slope Failure	https://koordinates.com/layer/4069-wellington-region-earthquake-induced-slope-	Greater Wellington Regional Council	<p>Earthquake induced slope failure susceptibility zones for the Wellington Region. This dataset is compiled from the "slope failure series" ArcInfo co
21013	Wellington Region ground shaking hazard zones	https://koordinates.com/layer/4070-wellington-region-ground-shaking-hazard-	Greater Wellington Regional Council	<p>Ground shaking series in the major urban areas of the Wellington Region. This dataset is compiled from the "ground shaking series" ArcInfo cover
21013	Wellington Region Liquefaction Potential	https://koordinates.com/layer/4068-wellington-region-liquefaction-potential/	Greater Wellington Regional Council	<p>Liquefaction potential in the Wellington Region urban areas. This dataset is a compilation of the "liquefaction potential" ArcInfo coverage series w
21013	Wellington Waterfront Reclamation dates and map	https://www.gns.cri.nz/content/download/7997/43532/file/Semmens%20et%20al_GNS%	GNS Science	
21013	Wellington Planning Map	http://wellington.govt.nz/~/media/your-council/plans-policies-and-bylaws/district-	Wellington City Council	
21014	Waterfront evaluation - Litmus Report	http://litmus.co.nz/wp-content/uploads/2015/11/2011-waterfront-	Wellington City Council	
21017	2013 higher density meshblocks >55ppl/ha	https://koordinates.com/layer/7312-nz-2013-higher-density-meshblocks-55ppl-ha/	Statistics NZ	
21017	2013-mb-dataset-Wellington-Region-dwelling	http://www3.stats.govt.nz/meshblock/2013/excel/2013_mb_dataset_Wellington_Regio	Statistics NZ	
21017	2013-mb-dataset-Wellington-Region-family	http://www3.stats.govt.nz/meshblock/2013/excel/2013_mb_dataset_Wellington_Regio	Statistics NZ	
21017	2013-mb-dataset-Wellington-Region-household	http://www3.stats.govt.nz/meshblock/2013/excel/2013_mb_dataset_Wellington_Regio	Statistics NZ	
21017	2013-mb-dataset-Wellington-Region-individual-part-1	http://www3.stats.govt.nz/meshblock/2013/excel/2013_mb_dataset_Wellington_Regio	Statistics NZ	
21017	2013-mb-dataset-Wellington-Region-individual-part-2	http://www3.stats.govt.nz/meshblock/2013/excel/2013_mb_dataset_Wellington_Regio	Statistics NZ	
21017	2013-mb-dataset-Wellington-Region-individual-part-3a	http://www3.stats.govt.nz/meshblock/2013/excel/2013_mb_dataset_Wellington_Regio	Statistics NZ	
21017	2013-mb-dataset-Wellington-Region-individual-part-3b	http://www3.stats.govt.nz/meshblock/2013/excel/2013_mb_dataset_Wellington_Regio	Statistics NZ	
21017	2013-usual-residence-by-workplace-address-area-unit	http://www3.stats.govt.nz/meshblock/2013/excel/2013_mb_dataset_Wellington_Regio	Statistics NZ	
21017	Deaths Module 1999 to 2013	www.stats.govt.nz%2F~%2Fmedia%2FStatistics%2Fbrowse-categories%2Fedu-and-	Statistics NZ	
21017	Design Quality Audit	http://wellington.govt.nz/~/media/your-council/meetings/Committees/Waterfront%	Wellington City Council	
21017	Evaluation of Waitangi Park - Qualitative Study	http://wellington.govt.nz/~/media/your-council/meetings/Committees/Waterfront%	Wellington City Council	
21017	living-outside-norm-tables	http://www.stats.govt.nz/~/media/Statistics/Census/2013%20Census/profile-and-	Statistics NZ	
21017	Meshblocks 2012 annual pattern	https://koordinates.com/layer/4238-nz-meshblocks-2012-annual-pattern/	Statistics NZ	
21017	Social Deprivation Index 2013	http://www.otago.ac.nz/wellington/otago069927.xls	Otago University	
21017	Use of Waitangi Park - Quantitative Study	http://wellington.govt.nz/~/media/your-council/meetings/committees/waterfront%2	Wellington City Council	
21017	NZ Population density by meshblock	https://koordinates.com/layer/7322-new-zealand-population-density-by-meshblock/	Statistics NZ	
21020	International visitor survey	http://www.mbie.govt.nz/info-services/sectors-industries/tourism/tourism-	MBIE	
21020	Regional Visitor Monitor	http://www.mbie.govt.nz/info-services/sectors-industries/tourism/tourism-	Ministry of Business Innovation and Employment	The Regional Visitor Monitor (RVM) collects information on international and domestic visitors to New Zealand's main tourist destinations - Auckland booking, activities, transport, accommodation, and environmental perceptions.
21021	AM013TrainCarriagequalitycomfortOverallhowdoyouratethecarriage	http://www.transport.govt.nz/ourwork/tmif/accesstothetransportsystem/am013/	Ministry of Transport	
21021	AM013TrainServiceavailabilityIstheserviceavailablewhenneeded	http://www.transport.govt.nz/ourwork/tmif/accesstothetransportsystem/am013/	Ministry of Transport	
21021	AM013TrainServicefrequencyDoestheserviceoccuroftenenough	http://www.transport.govt.nz/ourwork/tmif/accesstothetransportsystem/am013/	Ministry of Transport	
21021	AM013TrainServicereliabilityIstheserviceontime	http://www.transport.govt.nz/ourwork/tmif/accesstothetransportsystem/am013/	Ministry of Transport	
21021	AM013TrainServicetimeIsthejourneytimereasonable	http://www.transport.govt.nz/ourwork/tmif/accesstothetransportsystem/am013/	Ministry of Transport	
21021	AM013TrainTotalnumberofpeoplesurveyed	http://www.transport.govt.nz/ourwork/tmif/accesstothetransportsystem/am013/	Ministry of Transport	
21021	AM013TrainValueformoneyRatethevalueformoneyoftheservice	http://www.transport.govt.nz/ourwork/tmif/accesstothetransportsystem/am013/	Ministry of Transport	
21021	Commuter patterns	http://www.stats.govt.nz/datavisualisation/commuterview/index.html#	Statistics NZ	
21021	IRO 4484 FYI Villanti road count	https://fyi.org.nz/request/2529/response/8157/attach/4/IRO%204484%20FYI%20Villanti	Wellington City Council	
31104	Geonet Earthquake data	http://info.geonet.org.nz/display/appdata/Earthquake+Catalogue	GNS Science	Real time updates of earthquakes in NZ, lat/long, intensity, depth.

THIS DISSERTATION...

14,687
WORDS

491 hrs
29,489 min
EDITING TIME

73
REFERENCES

1,400 cups of coffee required

"data"
352 times

1:341
Graphic to word ratio

"data analysis"
55 times